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SNOW SURVEY and WATER SUPPLY FORECASTS for MONTANA & NORTHERN WYOMING

UNITED STATES DEPARTMENT of AGRICULTURE···SOIL CONSERVATION SERVICE.
and
MONTANA AGRICULTURAL EXPERIMENT STATION

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Data included in this report were obtained by the agencies named above in cooperation with the Bureau of Reclamation, U.S. Forest Service, U.S. Geological Survey, National Park Service, State Engineers of Montana and Wyoming and other Federal, State, and private organizations.

AS OF
MAY 1, 1960

USDA SCS-LINCOLN NEBR 1960

UNITED STATES DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

TO RECIPIENTS OF COOPERATIVE SNOW SURVEY AND WATER SUPPLY FORECAST REPORTS:

The climate of the cultivated and populated areas of the West is characterized by relatively dry summer months. Such precipitation as occurs falls mostly in the winter and early spring months when it is of little immediate benefit to growing crops. Fortunately, most of this precipitation falls as mountain snow which stays on the ground for months, melting later to sustain streamflow during the period of greatest demand during late spring and summer. Thus, nature provides in mountain snow an imposing water storage facility.

The amount of water stored in mountain snow varies from place to place as well as from year to year and accordingly, so does the runoff of the streams. The best seasonal management of variable western water supplies results from fore-knowledge of the runoff.

A snow survey consists of a series of about ten samples taken with specially designed snow sampling equipment along a permanently marked line, about 1000 feet in length, called a snow course. The use of snow sampling equipment provides snow depth and water equivalent values for each sampling point. The average of these values is reported as the snow survey measurement for a snow course.

Snow surveys are made monthly or semi-monthly beginning in January or February and continue through the snow season until April, May or June. Currently more than 1400 western snow courses are measured each year. These measurements furnish the key data for water supply forecasts.

By relating snow survey measurements taken over a period of years to spring-summer runoff during the same period, relationships have been developed which make it possible to forecast seasonal runoff several months in advance of occurrence. In order to make a forecast, once a forecast relationship has been developed, the maximum snow water content at previously selected key snow courses is usually entered in the forecast relationship. More accurate forecasts are often obtained when other factors such as soil moisture, base flow and spring precipitation are considered and included in the forecast relationships.

Listed below are the Federal-State-Private Cooperative Snow Survey and Water Supply Forecast reports available for the West which contain detailed information on snow survey measurements, streamflow forecasts, reservoir storage, soil moisture and other guide data to water management and conservation decisions.

PUBLISHED BY SOIL CONSERVATION SERVICE

REPORTS	ISSUED	LOCATION	COOPERATING WITH
RIVER BASINS			
Colorado and State of Utah	Monthly (Jan.-May)	Salt Lake City, Utah	Utah State Engineer and Other Agencies
Columbia and States of Idaho and Alaska	Monthly (Jan.-May)	Boise, Idaho	Idaho State Reclamation Engineer
Upper Missouri and State of Montana	Monthly (Feb.-May)	Bozeman, Montana	Mont. Agr. Exp. Station
West-Wide	Oct. 1, Apr. 1, May 1	Portland, Oregon	All Cooperators
STATES			
Arizona	Semi-monthly (Jan. 15 - Apr. 1)	Phoenix, Arizona	Salt R. Valley Water Users Association Ariz. Agr. Exp. Station
Colorado and New Mexico	Monthly (Feb.-May)	Fort Collins, Colorado	Colo. Agr. Exp. Station Colo. State Engineer N. Mex. State Engineer
Nevada	Monthly (Feb.-Apr.)	Reno, Nevada	Nevada Dept. of Conservation and Natural Resources - Division of Water Resources
Oregon	Monthly (Jan.-May)	Portland, Oregon	Ore. Agr. Exp. Station Oregon State Engineer
Washington	Monthly (Feb.-May)	Spokane, Washington	Wash. State Dept. of Conservation
Wyoming	Monthly (Feb.-June)	Casper, Wyoming	Wyoming State Engineer

Copies of these various reports may be secured from:

Head, Water Supply Forecasting Section
Soil Conservation Service
209 S. W. Fifth Ave., Portland 4, Oregon

PUBLISHED BY OTHER AGENCIES

REPORT	ISSUED	AGENCY
British Columbia	Monthly (Feb.-June)	Comptroller, Water Rights Br., Dept. of Lands and Forests, Parliament Bldg., Victoria, B.C., Canada
California	Monthly (Feb.-May)	California Dept. of Water Resources, Sacramento, California

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FEDERAL-STATE-PRIVATE COOPERATIVE
SNOW SURVEYS and WATER SUPPLY FORECASTS
for
MONTANA AND NORTHERN WYOMING

(Upper Missouri and Upper Columbia River Basins)

Report Prepared By:

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U. S. Department of Agriculture
Soil Conservation Service
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Montana Agricultural Experiment Station
Bozeman, Montana

Report Issued By:

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State Conservationist
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O. W. Monson
Irrigation Engineer
Montana Agricultural
Experiment Station

R. E. Huffman
Director
Montana Agricultural
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MONTANA WATER SUPPLY OUTLOOK
as of
May 1, 1960

The 1960 Water Supply Outlook is only FAIR. This is indicated by snow survey measurements made on or about May first. Unseasonal warm weather in late March removed most of the low elevation snow and ripened high elevation snow. This melt period was followed by general storms that replaced much of the water lost in March. Many of the high elevation courses are now close to or above the May first average. Streamflow forecasts have been adjusted for the difference in snow-pack; the May-September runoff period is used this month.

Reservoir storage is good throughout Montana.

Soil moisture is close to the field capacity over most basins. Very little water will be lost to soil priming.

MISSOURI RIVER BASIN

The southern portion of the Beaverhead, Madison and Yellowstone watersheds did not receive their quota of the April storms. The May-September forecast for the Red Rock River and the Beaverhead River at Barratts is 40 percent below the 1943-57 average. The Big Hole River at Melrose is forecast at 90 percent average. The Madison River at West Yellowstone is predicted to flow 70 percent average during the May-September period, with the Gallatin River at Gateway forecast to flow 84 percent average. The Missouri River at Toston should flow close to 82 percent average during the May-September period. This same percentage carries on down the Missouri River into Fort Peck.

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Snow Cover over Yellowstone Park continues to be very light. The Yellowstone River at Corwin Springs is expected to flow only 68 percent average, with no increase in percentage downstream past Sidney.

Streamflow forecasts for the Sun and Marias Rivers are not bright; they are forecast at 73 and 70 percent average respectively for the May-September period.

COLUMBIA RIVER BASIN IN MONTANA

Snow-pack on the upper portion of the Clark Fork River is confined to the high elevations. The May-September forecast for the Clark Fork River above Milltown has been lowered to 67 percent of the 1943-57 average. The Blackfoot River above Bonner is expected to flow 87 percent average during May through September. The Bitterroot River at Darby is forecast to flow 73 percent average during this same period. This forecast is 30 percent less than last season. The Clark Fork River below Missoula is forecast to flow 73 percent average; the same percentage flow is forecast for St. Regis. The Flathead River and its tributaries are forecast to flow about 10 to 20 percent below average during the May-September period.

INDEX TO MONTANA & NORTHERN WYOMING SNOW COURSES

Drainage Basin and Course Name	Montana Number	Elev.	Location Sec. Lat.	Location Twp.	Range Long.	Record Began	Measuring Dates	Measured By
MISSOURI RIVER DRAINAGE								
JEFFERSON RIVER								
(ROCK-BEAVERHEAD)								
Lakeview Ridge	11E3	7400	27	14S	2W	1948	3,4,5	10
Lakeview Canyon	11E4	6930	26	14S	2W	1948	3,4,5	10
Limekiln	12E2	6950	5	15S	9W	1948	3,4	1
White Pine Ridge	12E1	8850	18	14S	9W	1948	3,4	1
(HORSE PRAIRIE)								
Bloody Dick	13D10	7600	12	8S	16W	1948	3,4	1
Gold Stone	13D9	8100	11	8S	16W	1948	3,4	1
Lemhi Pass	13E1	7480	9	10S	15W	1948	3,4	1
Terrell Creek	13D12	6650	14	9S	15W	1948	3,4	1
Trail Creek	13E2	7090	15	10S	15W	1948	3,4	1
Selway Junction	13D11	6800	27	8S	15W	1948	3,4	1
(BIG HOLE)								
Big Hole Pass	13D3	7240	28	3S	18W	1948	3,4	1
Big Hole Pass-Be.	13D4	6900	24	3S	18W	1948	3,4	1
East Boundary	13D5	6700	22	3S	17W	1948	3,4	1
Gibbons Pass	13D2	7100	4	2S	19W	1934	1,2,3,4,5	1,3
Jahnke Creek	13D8	7340	25	7S	16W	1948	3,4	1
Miner Forks	13D6	7300	24	6S	17W	1948	3,4	1
Miner Lake	13D7	6720	10	6S	16W	1945	3,4,5	1
(WISE RIVER)								
Anderson Mdw.	13D14	7000	18	3S	12W	1948	3,4	1
Elk Horn	13D15	8450	15	4S	12W	1935	3,4,5	3
Wise River	13D13	6300	15	2S	12W	1948	3,4	1
(RUBY RIVER)								
Flashlight	12D3	6950	22	8S	7W	1945	3,4,5	1
MADISON RIVER								
Nebgen	11E5	6550	22	11S	3E	1934	1,2,3,4,5	3
West Yellowstone	11E7	6700	34	13S	5E	1934	1,2,3,4,5	3
Norris Basin	10E2	7500	44°44'		110°-42'	1936	3,4	6
GALLATIN RIVER								
Devil's Slide	10D4	8100	14	5S	6E	1935	2,3,4,5	2,1
Hood Meadow	10D3	6600	22	4S	6E	1935	2,3,4,5	2,1
New World	10D1	6700	24	3S	6E	1939	1,2,3,4,5	7
21-Mile	11E6	7150	1	11S	5E	1934	1,2,3,4,5	3
MISSOURI RIVER MAIN STEM								
Chessman Reservoir	12C5	6200	2	8N	5W	1936	1,2,3,4,5	3
Crystal Lake	9C1	6100	19	12N	18E	1941	3,4	1,2
Grasshopper	10C2	7000	19	9N	8E	1938	3,4	2
Kings Hill	10C1	7950	35	13N	7E	1934	3,4,5	3
Picnic Grounds	12C6	6500	10	5N	6W	1941	2,3,4	4
Pipestone Pass	12D1	7200	10	1N	7W	1938	2,3,4,5	1
Stemple Pass	12C1	6900	16	13N	7W	1934	3,4,5	3
Ten Mile Creek L	12C2	6250	13	8N	6W	1935	1,2,3,4,5	3
Ten Mile Creek M	12C3	6800	13	8N	6W	1934	1,2,3,4,5	3
Ten Mile Creek U	12C4	8000	19	8N	5W	1935	1,2,3,4,5	3
(TETON RIVER)								
Freight Creek	12A1	6000	13	26N	10W	1948	3,4	1
Waldron Creek	12B2	5600	16	25N	9W	1948	3,4	1
West Fork	12B1	6000	6	25N	9W	1948	3,4	1
(SUN RIVER)								
Benchmark	12B8	5500	9	20N	10W	1948	3,4	1
Cabin Creek	12B6	5400	33	23N	10W	1949	3,4	1,2
5-Bull	12B9	5600	36	20N	10W	1948	3,4	1,2
Gates Park	12B5	5300	31	24N	10W	1949	3,4	1,2
Goat Mountain	12B7	7000	20	22N	10W	1934	3,4	3
Wrong Ridge	12B3	6800	17	25N	10W	1949	3,4	1,2
Wrong Creek	12B4	5700	32	25N	10W	1949	3,4	1,2
(MARIAS RIVER)								
Marias Pass	13A5M	5250	34	30N	14W	1934	1,2,3,4,5	3
(MILK RIVER)								
Rocky Boy	9A1	5200	15	28N	16E	1941	3,4	7
(MUSSELSHELL RIVER)								
Grasshopper	10C2	7000	19	9N	8E	1938	3,4	2
MISSOURI RIVER DRAINAGE (cont.)								
(UPPER YELLOWSTONE)								
Camp Senie	9D1	7890	2	8S	18E	1937	4	1
Canyon	10E3	7750	44°-44'		110°-30'	1938	1,2,3,4,5	6
Cooke City	10D7	7400	25	9S	14E	1937	1,2,3,4,5	6
Crevice Mt.	10D5	8400	22	9S	9E	1935	3,4	2
Independence	10D6	8000	22	7S	12E	1940	3,4	1
Lake Camp	10E4	7850	44°-34'		110°-24'	1936	1,2,3,4,5	6
Lupine Creek	10E1	7300	44°-54'		110°-37'	1938	1,2,3,4,5	6
Lodgepole	9E1	8200	32	56N	106W	1940	2,3,4,5	1,4
West Rosebud	9D2	7500	10	7S	16E	1960	1,2,3,4,5	4
(SHIELDS RIVER)								
Porcupine	10C3	6500	10	4N	10E	1938	3,4	1
LOWER YELLOWSTONE								
(WIND RIVER) Wyoming								
Big Warm	9F12	8800	36	42N	109W	1955	2,3,4,5	1
Brooke Lake #3	10F8	9200	23	44N	110W	1939	2,3,4,5	1
Burroughs Creek	9F4	8800	15	43N	107W	1948	2,3,4,5	1
Dinwoodie	9F10	10000	21	39N	105W	1948	2,3,4,5	1
Dry Creek	9F9	9500	34	4N	6W	1948	2,3,4,5	1
DuNoir	9F6	8750	27	42N	108W	1940	2,3,4,5	1
East Fork	9F13	9200	23	44N	104W	1956	2,3,4,5	1
Geyser Creek	9F7	8500	12	41N	108W	1948	2,3,4,5	1
Little Warm	9F8	9500	24	41N	108W	1948	2,3,4,5	1
Sheridan R.S. #1	9F5	7500	3	42N	109W	1939	2,3,4,5	1
Sheridan R.S. #2	9F14	7500	3	42N	109W	1955	2,3,4,5	1
T-Cross Ranch	9F3	8000	1	43N	107W	1940	2,3,4,5	1
Togwotee Pass	10F9	9600	29	44N	110W	1936	2,3,4,5	11
(POPO AGIE RIVER) Wyoming								
Blue Ridge	8G2	9500	23	31N	101W	1939	2,3,4,5	1
Bruce'e Camp	8G5	6500	24	32N	101W	1955	2,3,4	1
Nobb's Park	9G3	10000	22	2S	3W	1948	2,3,4,5	1
Mosquito Park R.S.	9G4	9500	23	2S	3W	1940	2,3,4,5	1
Sawmill Glade	8G1	8500	3	31N	101W	1939	2,3,4,5	1
South Pass	8G3	9000	13	30N	101W	1939	2,3,4,5	1
St. Lawrence	9F11	9000	26	1N	4W	1940	2,3,4,5	1
Trout Creek	9G2	8400	5	2S	2W	1948	2,3,4,5	1
(OWL CREEK) Wyoming								
Beavers Mill	9F2	8900	6	43N	102W	1948	2,3,4,5	1
Owl Creek	8F1	8700	36	43N	101W	1948	2,3,4,5	1
(GREYBULL RIVER) Wyoming								
Timber Creek #1	9E2	8800	25-	47N	103W	1948	2,3,4,5	1
Timber Creek #2	9E3	8800	25	47N	103W	1955	2,3,4,5	1
Wood River #1	9F1	8000	28	46N	103W	1939	2,3,4,5	1
Wood River #2	9F15	8000	28	46N	103W	1956	2,3,4,5	1
(SHOSHONE RIVER) Wyoming								
East Entrance	10E6	7000	17	52N	109W	1948	1,2,3,4,5	6
Sylvan Pass	10E5	7100	12	52N	110W	1936	1,2,3,4,5	6
(NOWOOD CREEK) Wyoming								
Cold Springs Camp	7E25	8700	1	50N	88W	1956	2,3,4,5	1
Medicine Lodge Lks	7E24	9500	7	51N	87W	1956	2,3,4,5	1
Munkers Pass	7E8	9700	11	48N	85W	1950	2,3,4,5	1
North Powder	7E36	8300	20	47N	85W	1956	2,3,4,5	1
Onion Gulch	7E27	8100	31	48N	85W	1956	2,3,4,5	1
Tensleep Lake	7E26	9075	33	50N	86W	1956	2,3,4,5	1
Tensleep R.S.	7E7	8300	30	49N	86W	1935	2,3,4,5	1
Tyrell R.S.	7E35	8300	30	49N	86W	1956	2,3,4,5	1
(SHELL CREEK) Wyoming								
Bald Mountain	7E21	9600	33	56N	91W	1956	2,3,4,5	1
Beever-Tongue Div.	7E20	9200	12	55N	91W	1956	2,3,4,5	1
Bone-Spring Div.	7E18	9200	32	55N	89W	1956	2,3,4,5	1
Granite Creek Camp	7E22	7800	15	53N	89W	1956	2,3,4,5	1
Granite Pass	7E17	8950	19	54N	88W	1956	2,3,4,5	1
Horse-Trail Div.	7E19	9200	29	55N	90W	1956	2,3,4,5	1
Ranger Creek	7E4	8800	32	53N	88W	1935	2,3,4,5	1
Shell Creek	7E23	9600	12	52N	88W	1956	2,3,4,5	1
(PORCUPINE CREEK) Wyoming								
Five Spgs. Falls	7E31	7500	19	56N	92W	1956	2,3,4,5	1
Medicine Wheel	7E30	9000	24	56N	92W	1956	2,3,4,5	1
(TONGUE RIVER) Wyoming								
Beaver Tongue Div.	7E20	9200	12	55N	91W	1956	2,3,4,5	1
Big Goose #1	7E2	7700	4	53N	86W	1935	2,3,4,5	1
Big Goose #2	7E32	7700	4	53N	86W	1955	2,3,4,5	1
Bone-Spring Div.	7E18	9200	32	55N	89W	1956	2,3,4,5	1
Burgess R.S. #1	7E1	7900	36	56N	89W	1950	2,3,4,5	1
Burgess R.S. #2	7E33	7900	36	56N	89W	1955	2,3,4,5	1
Dome Lake #1	7E3	8800	11	53N	87W	1950	2,3,4,5	1
Dome Lake #2	7E34	8800	11	53N	87W	1950	2,3,4,5	1
Gloom Creek	7E14	9300	32	55N	87W	1956	2,3,4,5	1
Granite Pass	7E17	8950	19	54N	88W	1956	2,3,4,5	1
MISSOURI RIVER DRAINAGE (cont.)								
(TONGUE RIVER cont.)								
Horse Trail Div.	7E19	9200	29	55N	90W	1956	2,3,4,5	1
Lake Geneva	7E16	9000	7	52N	86W	1956	2,3,4,5	1
North Tongue	7E15	8600	17	55N	89W	1956	2,3,4,5	1
Sibley Lake	7E11	8000	10	55N	88W	1956	2,3,4,5	1
Sucker Creek	7E12	9000	19	55N	87W	1956	2,3,4,5	1
Steamboat Point	7E10	7500	32	56N	87W	1956	2,3,4,5	1
Wood Rock O.S.	7E13	8500	3	54N	88W	1956	2,3,4,5	1
(POWDER RIVER) Wyoming								
Crazy Woman	6E2	8200	6	47N	84N	1956	2,3,4,5	1
Muddy Creek O.S.	6E1	7800	2	48N	84N	1956	2,3,4,5	1
Munkers Pass	7E8	9700	11	48N	85W	1950	2,3,4,5	1
North Powder #2	7E36	8300	20	47N	85W	1956	2,3,4,5	1
Onion Gulch	7E27	8100	31	48N	85W	1956	2,3,4,5	1
Soldier Park	7E5	8700	36	51N	85W	1950	2,3,4,5	1
Sour Dough	7E6	8500	17	49N	84W	1936	2,3,4,5	1
COLUMBIA RIVER BASIN								
KOOTENAI RIVER								
Baree Creek	15B11	5500	6	25N	30W	1956	4,5,5½	2
Baree Mountain	15B1	6000	1	25N	31W	1937	4,5,5½	2
Red Mountain	15A1	6000	4	36N	29W	1937	3,4,5,5½	1,2
Weasel Divide	14A7	5450	8	37N	24W	1955	4,5,5½	1,2
FLATHEAD RIVER								
Basin Creek	13B14A	5000	11	19N	12W	1951	2,3,4,5	2
Big Creek	13B3	6750	6&7	22N	16W	1941	3,4,5	5
Brush Creek	14A4	5000	13	30N	26W	1937	3,4,5	1,2
Cattle Queen	13A1	4700	7	35N	17W	1939	3,4,5	6
Desert Mountain	13A2M	5600	24	31N	19W	1937	1,2,3,4,5	1,2
Hell Roaring Div.	14A3	5770	35	32N	22W	1942	3,4,5	1,2
Holbrook	13B13A	4530	18	21N	13W	1951	1,2,3,4,5	2
Kishenehn	14A6	3886	14	37N	22W	1954	4,5	6
Logan Creek	14A5	4300	34	30N	24W	1937	3,4,5	2
Marias Pass	13A5M	5250	34	30N	14W	1934	1,2,3,4,5	3
Mineral Creek	13A16	4000	29	35N	17W	1957	3,4,5	6
Quintonkon	13A13	3800	11	26N	17W	1951	2,3,4,5	1,2
Spotted Bear Mt.	13B2M	7000	23	25N	15W	1948	3,4,5	1,2
Strawberry Lake	13A10	6500	11	28N	19W	1948	3,4,5	2
Trinkus Lake	13B1	6500	9	25N	17W	1948	3,4,5	2
Trout Lake	13A12M	3600	21	28N	17W	1948	3,4,5	1,2
Twin Creeks	13B11	3580	14	26N	16W	1951	2,3,4,5	1,2
Upper Holland Lk.	13B5	7000	28	20N	16W	1948	3,4,5	2
CLARK FORK								
Baree Creek	15B11	5500	6	25N	30W	1956	4,5,5½	2
Baree Mountain	15B1	6000	1	25N	31W	1937	4,5,5½	2
Black Pine	13C13	7100	25	8N	15W	1960	3,4,5	1
Coyote Hill	13B10	4200	12	18N	16W	1952	1,2,3,4,5	2
El Dorado Mine	13C9	7800	23	8N	12W	1949	4	1
Fred Burr Pass	13C11	8000	12	6N	13W	1957	3,4,5	1
Freezeout Summit	15B10	6800	21	15N	27W	1937	4,5	2
Gold Creek Lk.	13C10	7200	14	8N	12W	1949	4	1
Hoodoo Creek	15C1	6200	9	14N	27W	1937	4,5	2
Intergaard	13C4	6450	6	5N	13W	1936	2,3,4	4
Lubrecht Forest #6	13C8	4400	11	14N	15W	1951	1,2,3,4,5	12
North Fork Jocko	13B7	6330	3	17N	17W	1941	3,4,5	5
Pipestone Pass	12D1	7200	10	1N	7W	1938	2,3,4,5	1
Red Lion	13C12	7000	27	6N	13W	1958	3,4,5	1
Slide Rock Mt.	13C2	7100	35	10N	16W	1937	4	1
Southern Cross	13C5	6500	8	5N	13W	1936	2,3,4	4
Stemple Pass	12C1	6900	16	13N	7W	1934	3,4,5	3
Storm Lake	13C7	7780	19	4N	13W	1939	2,3,4	1
Stuart Mill	13C6	6500	19	5N	13W	1936	2,3,4	4
Stuart Mountain	13C1	7400	6	14N	18W	1936	4	1,2
TV Mountain	14B1	6800	33	15N	19W	1956	1,2,3,4,5	1
BITTERROOT RIVER								
Ambroso	13C16	6475	28	9N	18W	1960	3,4,5	1
East Fork R.S.	13D1	5400	16	2N	17W	1937	4	1
Gibbons Pass	13D2	7100	4	2S	19W	1934	1,2,3,4,5	3,1
Lolo Pass	14C5	5230	16	38N	15E	1956	3,4,5,5½	2
Lost Horse	14C7	5940	5	4N	23W	1960	3,4,5	1
Nez Perce Camp	14D2	5580	19&20	1S	23W	1937	3,4,5	1
Nez Perce Pass	14D1	6575	32	28N	17E	1937	1,2,3,4,4½,5,5½	1
Powell R.S.	14C6	4230	33	37N	14E	1956	3,4,5,5½	2
Skalkaho Summit	13C3	7259	30	6N	17W	1937	4	1
Twin Lakes	14C8	6510	32	5N	23W	1960	3,4,5	1
SASKATCHEWAN RIVER BASIN								
ST. MARY RIVER								
Iceberg Lake #3	13A3	5600	48°-50'		113°-43'	1922	5	
Josephine Upper	13A15	5000	48°-50'		113°-42'	1956	5	3,9
Josephine Lower #9	13A14	4900	48°-47'		113°-41'	1955	5	
Mount Allen #7	13A7	5700	48°-46'		113°-41'	1922	5	3,9
Piegan #6	13A6	5500	48°-46½'		113°-41¼'	1922	5	3,9
Ptarmigan #8	13A8	5800	48°-50'		113°-44'	1937	5	3,9

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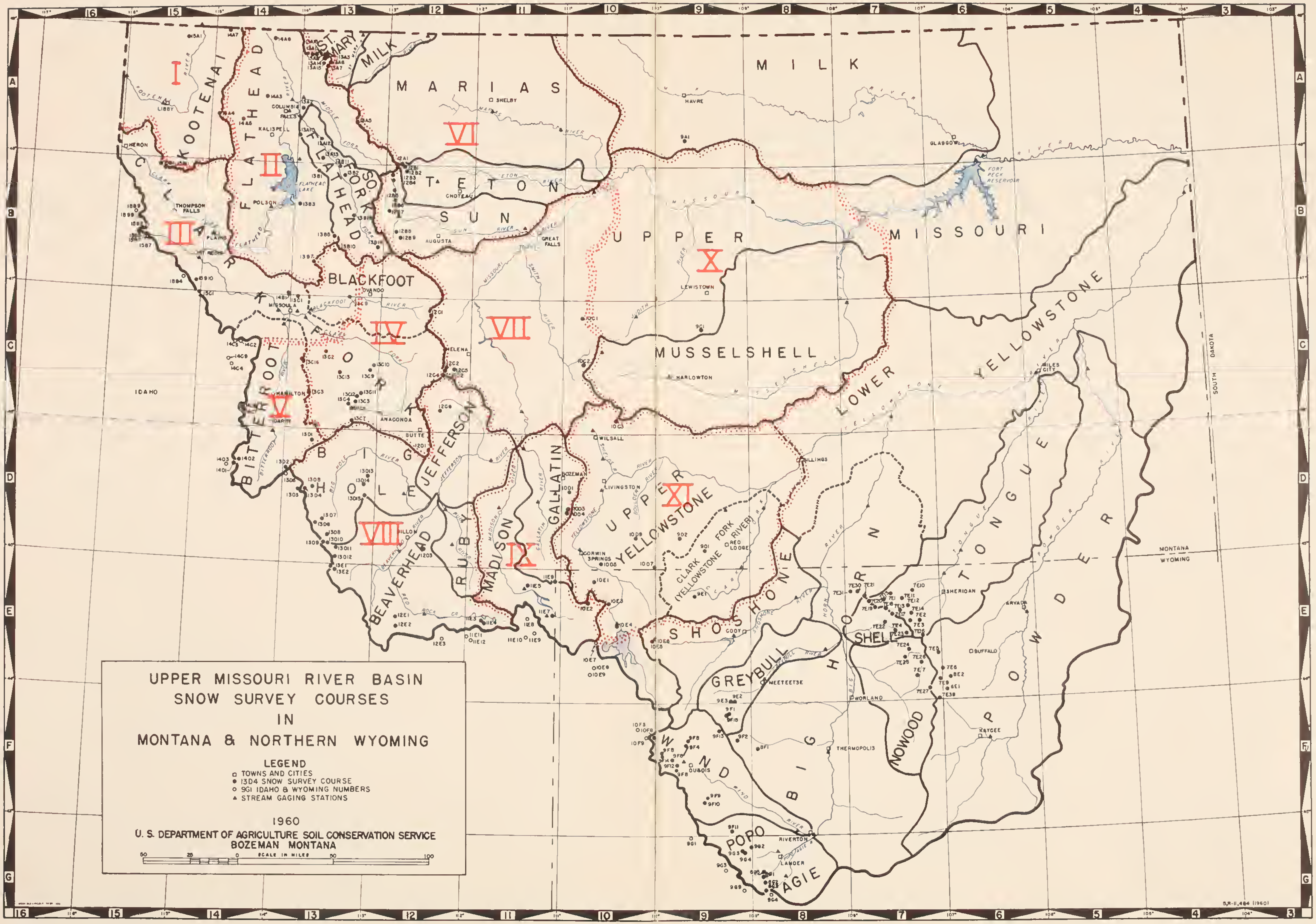
a. Numerals 1,2,3,4 and 5 refer to January 1, February 1, March 1, April 1 and May 1.

b. Numerals refer to Agency that secures the snow survey as follows:

1. Soil Conservation Service
2. U. S. Forest Service
3. U. S. Geological Survey
4. Montana Power Company
5. U. S. Indian Service
6. National Park Service
7. Montana Experiment Station
8. City of Bozeman
9. Dominion Water & Power Bureau
10. U. S. Fish and Wildlife Service
11. U. S. Bureau of Reclamation
12. Montana State Forestry School

M - Soil Moisture
A - Aerial Marker

5,R-11,484 - (1960)



UPPER MISSOURI RIVER BASIN
SNOW SURVEY COURSES
IN
MONTANA & NORTHERN WYOMING

LEGEND
□ TOWNS AND CITIES
● 13D4 SNOW SURVEY COURSE
○ 9G1 IDAHO & WYOMING NUMBERS
▲ STREAM GAGING STATIONS

1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE
BOZEMAN MONTANA

COMPARISON OF SNOW COVER WITH THAT OF PREVIOUS YEARS

Summary of Snow Survey Data by Tributary Watersheds May 1, 1960

TRIBUTARY WATERSHED	No. of Courses Averaged	No. Year Used	1960 Snow Water Equivalent Expressed as Percent of 1959	1960 Snow Water Equivalent Expressed as Percent of Average
COLUMBIA RIVER BASIN IN MONTANA				
Kooteani above Libby	11	7-15	83	84
Flathead	23	3-15	76	89
Lower Clark Fork	9	3-15	81	89
Upper Clark Fork	7	12-15	100	110
Bitterroot	4	13-15	89	90
MISSOURI RIVER BASIN IN MONTANA				
Marias, Teton & Sun	6	3-15	67	80
Missouri Main Stem	6	11-15	92	109
Beaverhead-Jefferson	10	7-15	100	88
Madison-Gallatin	6	4-15	77	81
Judith-Musselshell	1	11	78	100
Upper Yellowstone	10	4-15	63	67

AVAILABLE SOIL MOISTURE
as of
May 1, 1960

Drainage Basin and Station	Station No.	Elev.	Soil Profile in Inches		Date	Soil Moisture Content in Inches About 5/1/60				Yrs
			Depth	Cap.		1960	1959	1958	Avg.	
GALLATIN										
College Site	11D2M	4856	54	14.5	4/29	13.1	11.9	12.3	11.6	3
FLATHEAD										
Marias Pass	13A5M	5250	54	8.4	5/1	6.8	6.6	7.0	6.8	6
Spotted Bear R.S.	13B15M	3700	28	5.9	5/2	4.9	5.0	4.7	5.0	3
Trout Lake	13A12M	3600	54	11.8	5/3	12.4	12.3	12.8	12.5	3

AVAILABLE SOIL MOISTURE
as of
October 1, 1959

						1959	1958	1957	Avg.	
GALLATIN										
College Site	11D2M	4856	54	14.5	10/2	8.6	6.8	4.4	5.8	4
FLATHEAD										
Marias Pass	13A5M	5250	54	8.4	10/1	5.6	4.5	3.4	4.5	5
Spotted Bear R.S.	13B15M	3700	28	5.9	9/29	4.3	3.7	1.2	2.7	3
Trout Lake	13A12M	3600	54	11.8	9/29	9.8	10.5	2.1	7.2	3

WATER SUPPLY OUTLOOK
KOOTENAI RIVER BASIN
MONTANA

AS OF:

MAY 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the Kootenai River basin in Montana remains GOOD.

Snow surveys made in Montana near the first of May indicate that water stored in the snow-pack is near average for this time of year. The snow-pack in the Kootenai drainage above Libby is 83 percent of last year and 84 percent of the 1943-57 average.

Streamflow is forecast to be near average for the May through September period on the Kootenai River. Tributary streams in the northern portion of the drainage in Montana should flow near average during the May through September period. Tributary streams in the southern portion of the drainage should flow 10 to 20 percent below average.

Report Prepared by

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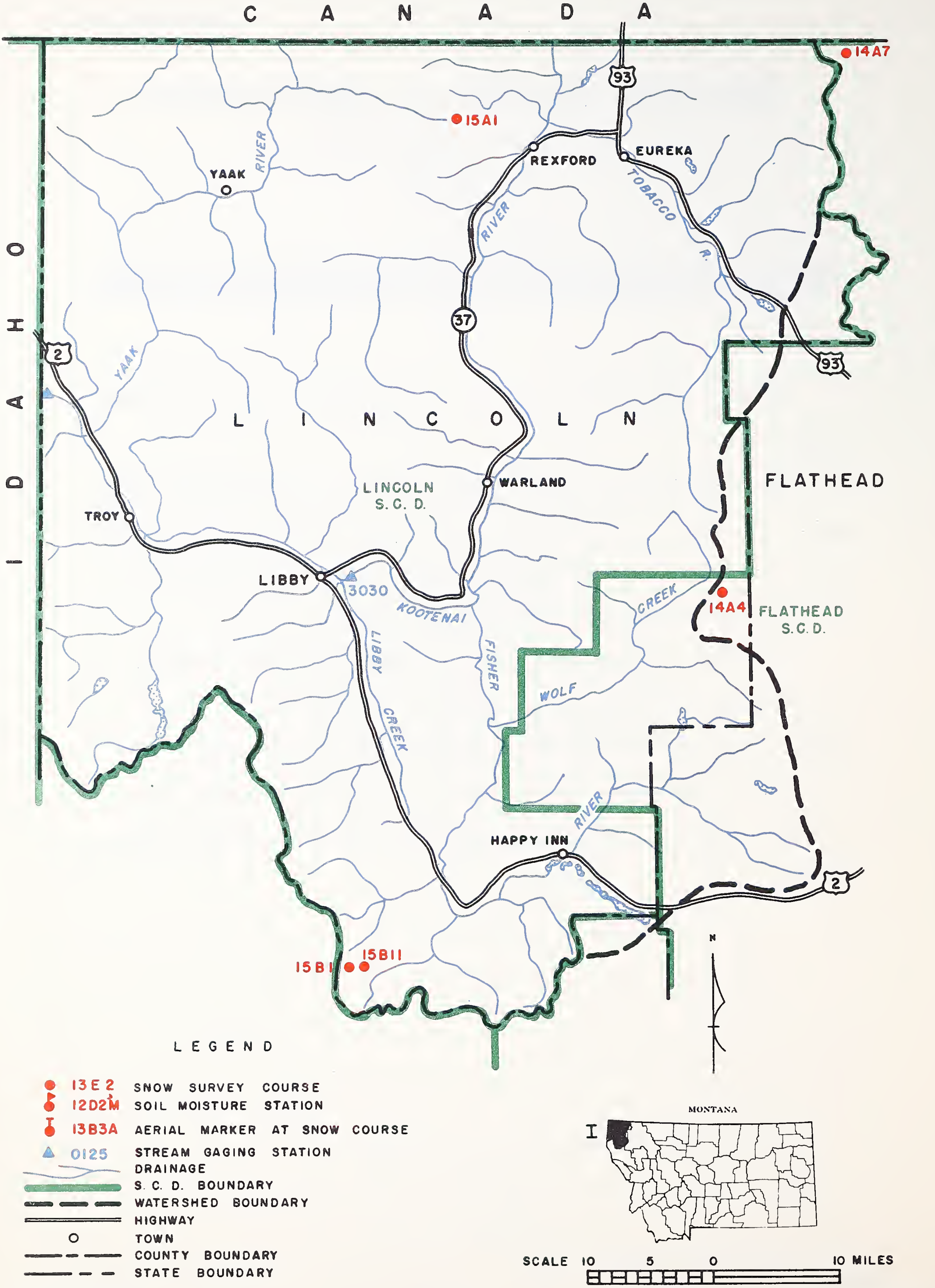
BOX 855 BOZEMAN, MONTANA

THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

USDA SCS LINCOLN NEBR 1960



USDA-SCS-LINCOLN, NEBR. 1960

5,L-16,507.2

WATER SUPPLY FORECASTS

AS OF MAY 1, 1960 - WATERSHED I

(1000 Acre Feet)

FORECAST POINT NO.	FORECAST POINT NAME	FORECAST PERIOD	FORECAST THIS YEAR	% NORMAL	MEASURED + LAST YEAR	MEASURED + NORMAL
	KOOTENAI RIVER					
3030	Libby (at)	May-Sept	6586	93	9058	7052
		May-July	5600	93	7326	6024
3050	Leonia (at)	May-Sept	7550	94	9960	7993
		May-July	6470	94	8152	6904

Correction: In the April 1, 1960 Water Supply Outlook, the April-July forecast for the Kootenai River at Leonia should have been 7,270,000 acre feet instead of 8,520,000 acre feet.

(+) Provisional data furnished by the U. S. Geological Survey.

RESERVOIR STORAGE DATA

AS OF

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED THIS YEAR	MEASURED LAST YEAR	MEASURED NORMAL

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

USDA-SCS-LINCOLN, NEBR. 1960

SNOW SURVEY DATA

AS OF MAY 1, 1960

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
			DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
NO.	NAME	ELEVATION				LAST YEAR	AVERAGE	
15B11	Baree Creek	5500	5/2	90	43.2	52.0	-	-
15B1	Baree Mountain	6000	5/2	92	42.8	53.6	46.8	15
14A4	Brush Creek	5000	4/28	20	7.3	12.0	12.3	8
Can 10	Fernie	3500	5/1	0	0	0	3.4	12
Can 12A	Field	4200	4/26	0	0	1.9	-	-
Can 43	Gray Creek	5100	4/30	54	18.9	19.3	20.6	10
Can 33	Kicking Horse	5400	4/30	29	11.4	17.8	10.7	11
Can 20B	Kimberley	3800	4/30	0	0	0	-	-
Can 32	Marble Canyon	5000	5/2	28	10.7	16.8	13.6	11
Can 10A	New Fernie	4100	5/1	0	0	0	10.0	7
15A1	Red Mountain	6000	4/26	56	20.2	20.7	19.7	15
Can 8A	Sinclair Pass	4500	5/2	2	0.5	0.7	3.4	8
Can 20A	Sullivan Mine	5100	4/28	29	11.1	13.0	11.3	12
Can 41	Upper Elk River	4400	4/30	0	0	-	-	-
14A7	Weasel Divide	5450	4/27	87	34.3	37.0	34.7	13

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

WATER SUPPLY OUTLOOK

FLATHEAD RIVER BASIN

MONTANA

AS OF:
MAY 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The 1960 Water Supply Outlook for the Flathead River basin is nearly the same as last month.

Snow surveys made near the first of May indicate that water stored in the snow-pack is 76 percent of last year and 89 percent of the 1943-57 average.

The North Fork Flathead is forecast to flow 83 percent average during May through September. The South Fork Flathead is expected to flow 1,610,000 acre feet, or 80 percent average, during the May through September period. The Swan River is forecast at 92 percent average and the Flathead River at Polson, 82 percent average.

Reservoir storage is above average for this time of year.

Report Prepared by

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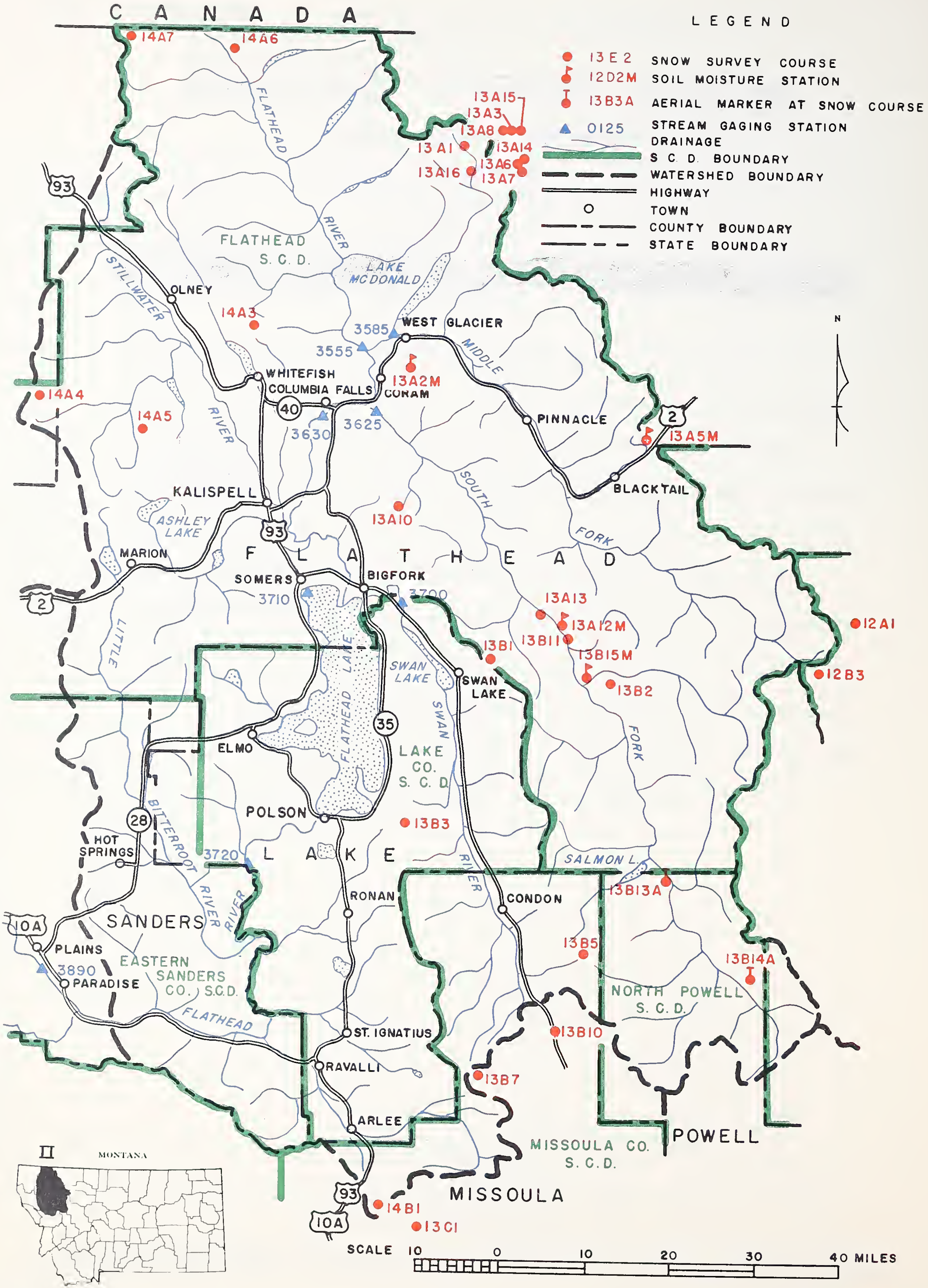
THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

USDA SCS LINCOLN NEBR 1960



USDA SCS LINCOLN NEBR 1960

5,L-16,398

USDA-SCS-LINCOLN NEBR 1960

WATER SUPPLY FORECASTS

AS OF MAY 1, 1960 - WATERSHED II

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	% NORMAL	MEASURED +	
NO.	NAME				LAST YEAR	NORMAL
3555	NORTH FORK FLATHEAD RIVER Columbia Falls (near)	May-Sept	1456	83	2138	1749
		May-July	1316	83	1863	1576
		May-June	1090	84	1527	1298
3585	MIDDLE FORK FLATHEAD RIVER West Glacier (near)	May-Sept	1364	81	2130	1687
		May-July	1257	81	1925	1552
		May-June	1052	82	1565	1286
3625	SOUTH FORK FLATHEAD RIVER Columbia Falls (nr)(17)	May-Sept	1610	80	2798	2015
		May-July	1518	80	2587	1897
		May-June	1308	81	2147	1617
3630	FLATHEAD RIVER Columbia Falls (at)(17)	May-Sept	4552	81	7089	5608
		May-July	4196	81	6418	5154
		May-June	3550	82	5239	4302
3720	Polson (near) (18)	May-Sept	5381	82	8616	6604
		May-July	4995	82	7721	6082
		May-June	4182	83	6279	5039
3700	SWAN RIVER Big Fork (near)	May-Sept	510	92	861	554
		May-July	444	92	728	479
		May-June	350	94	536	374

(17) Observed flow plus change in storage in Hungry Horse Reservoir.
(18) Observed flow plus change in storage in Hungry Horse Reservoir and Flathead Lake.
(+) Provisional data furnished by U. S. Geological Survey.

RESERVOIR STORAGE DATA

AS OF APRIL 30, 1960

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
3620	Hungry Horse	3428.0	2507.0	1904.0	1985.6
3710	Flathead	1791.0	1118.0	1174.0	936.0
3757	Camas	42.8	39.9	39.1	30.6
3800	Mission Valley	98.6	59.0	44.5	46.8
3805	Lower Jocko Lake	7.6	3.1	-	1.0

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

SNOW SURVEY DATA

AS OF MAY 1, 1960 - WATERSHED II

SNOW COURSE			CURRENT INFORMATION			PAST RECORD WATER CONTENT (Inches)		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	LAST YEAR	AVERAGE	
13B14A	Basin Creek	5000	4/29	0	0	0	2.1	7
14B3	Bazzoo Creek	4400	5/1	8	2.9	-	-	-
13B3	Big Creek	6750	5/3	115	53.3	65.4	48.1	8
14A4	Brush Creek	5000	4/28	20	7.3	12.0	12.3	8
13A2M	Desert Mountain	5600	4/29	38	15.5	16.5	13.0	15
Can 10	Fernie	3500	5/1	0	0	0	3.4	12
14A9	Griffin Creek Divide	5100	4/28	20	7.0	-	-	-
14A3	Hell Roaring Divide	5770	4/25	81	34.4	39.3	29.1	15
13B13A	Holbrook	4530	4/29	0	0	0	1.6	7
13A3	Iceberg Lake #3	5600	5/4	55	24.6	33.5	27.1	15
13A14	Josephine Lower #9	4900	5/3	34	12.1	20.3	21.6	3
14A5	Logan Creek	4300	4/28	0	0	2.2	3.3	13
13A5M	Marias Pass	5250	4/30	40	13.3	21.4	15.7	15
13A7	Mount Allen #7	5700	5/3	95	38.0	54.6	47.3	15
Can 10A	New Fernie	4100	5/1	0	0	0	10.0	7
13B7	North Fork Jocko	6330	5/4	83	40.7	62.4	46.0	8
13A6	Piegan Pass #6	5500	5/3	75	31.6	46.7	38.4	15
13A8	Ptarmigan #8	5800	5/4	74	31.1	46.6	37.8	15
13A13	Quintonkon	3800	5/2	0	0	-	6.6	6
13B2	Spotted Bear Mountain	7000	5/3	23	8.2	13.8	12.4	7
13A10	Strawberry Lake	6500	5/2	98	48.0	44.3	41.3	9
13B1	Trinkus Lake	6500	5/3	99	45.5	58.8	41.5	9
13A12M	Trout Lake	3600	5/3	4	1.7	3.6	10.4	9
14B1	TV Mountain	6800	4/30	36	13.4	24.6	-	-
13B11	Twin Creeks	3580	5/3	0	0	0	1.3	7
13B5	Upper Holland Lake	7000	4/29	86	36.4	50.8	36.5	7
14A7	Weasel Divide	5450	4/27	87	34.3	37.0	34.7	13

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

WATER SUPPLY OUTLOOK

LOWER CLARK FORK RIVER BASIN

MONTANA

AS OF:

MAY 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The 1960 Water Supply Outlook for the Lower Clark Fork Basin remains below average.

Snow surveys made near the first of May indicate that water stored in the snow-pack is 81 percent of last year and 89 percent of the 1943-57 average.

Streamflow is expected to be below average on the Clark Fork River during the May through September period. The Clark Fork at St. Regis is forecast to flow 2,836,000 acre feet, or 72 percent average for the May through September period. Tributary streams to this river should flow 10 to 20 percent below average for the next five months.

Report Prepared by

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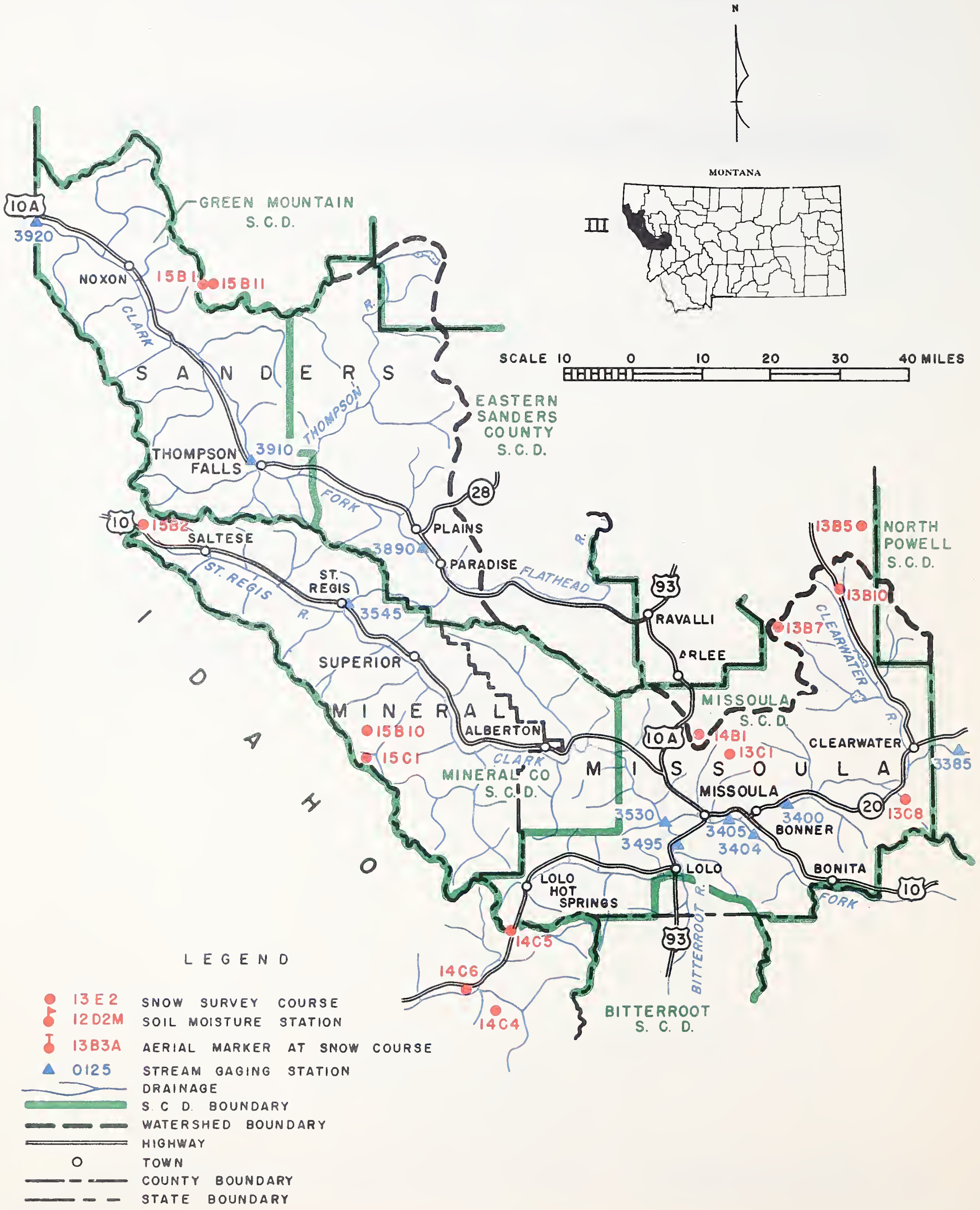
BOX 855 BOZEMAN, MONTANA

THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

USDA SCS LINCOLN NEBR 1960


N
MONTANA
III
SCALE 10 0 10 20 30 40 MILES
GREEN MOUNTAIN S.C.D.
EASTERN SANDERS COUNTY S.C.D.
NORTH POWELL S.C.D.
MISSOULA S.C.D.
MINERAL CO S.C.D.
BITTERROOT S.C.D.
SANDERS
MINERAL
MISSOULA
IDAHO
10A
3920
NOXON
15B1
15B11
CLARK
R.
THOMPSON
THOMPSON FALLS
3910
FORK
28
PLAINS
3890
PARADISE
FLATHEAD
R.
10
15B2
SALTESE
ST. REGIS
R.
ST. REGIS
3545
SUPERIOR
15B10
15C1
ALBERTON
CLARK
93
RAVALLI
ARLEE
13B5
13B10
13B7
CLEARWATER
R.
10A
14B1
13C1
CLEARWATER
3385
MISSOULA
20
13C8
3530
3405
3400
BONNER
3495
3404
LOLO
BONITA
10
FORK
LOLO HOT SPRINGS
14C5
93
BITTERROOT R.
14C6
14C4
LEGEND
13E2 SNOW SURVEY COURSE
12D2M SOIL MOISTURE STATION
13B3A AERIAL MARKER AT SNOW COURSE
0125 STREAM GAGING STATION
DRAINAGE
S.C.D. BOUNDARY
WATERSHED BOUNDARY
HIGHWAY
TOWN
COUNTY BOUNDARY
STATE BOUNDARY

WATER SUPPLY FORECASTS

AS OF MAY 1, 1960 - WATERSHED III

(1000 Acre Feet)

FORECAST POINT NO.	FORECAST POINT NAME	FORECAST PERIOD	FORECAST THIS YEAR	% NORMAL	MEASURED + LAST YEAR	MEASURED + NORMAL
3400	BLACKFOOT RIVER Bonner (near)	May-Sept	764	87	1152	879
		May-July	677	87	1028	782
		May-June	570	87	865	655
3404	CLARK FORK RIVER Milltown (above) (14)	May-Sept	469	67	591	698
		May-July	395	66	504	600
		May-June	324	66	409	492
3405	Missoula (above)	May-Sept	1233	78	1744	1577
		May-July	1065	77	1532	1383
		May-June	881	77	1274	1147
3530	Missoula (below)	May-Sept	2163	73	3230	2950
		May-July	1923	73	2853	2648
		May-June	1609	73	2407	2200
3545	St. Regis (at)	May-Sept	2836	72	4391	3948
		May-July	2512	71	3890	3540
		May-June	2106	71	3280	2950
3890	Plains (near) (18)	May-Sept	8526	79	13534	10837
		May-July	7760	79	12072	9815
		May-June	6512	80	9966	8125
3910	Thompson Falls (at)(18)	May-Sept	8880	78	14035	11393
		May-July	8060	78	12511	10320
		May-June	6804	80	10271	8532
3920	Whitehorse Rapids (at)(19)	May-Sept	9484	78	14768.7	12144
		May-July	8016	78	13086.4	10241
		May-June	7206	80	10769.3	9027

(14) Difference in observed flow, Clark Fork above Missoula & Blackfoot at Bonner.
(18) Observed flow plus change in storage in Flathead Lake & Hungry Horse Res.
(19) Observed flow plus change in storage in Hungry Horse Reservoir, Flathead Lak
and Noxon Reservoir.
(+) Provisional data furnished by U. S. Geological Survey.

RESERVOIR STORAGE DATA

AS OF APRIL 30, 1960

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED THIS YEAR	MEASURED LAST YEAR	MEASURED NORMAL
3913	Noxon	200.1	185.6	43.0	-

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

USDA SCS LINCOLN, NEBR 1960

SNOW SURVEY DATA

AS OF MAY 1, 1960

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches) LAST YEAR	WATER CONTENT (Inches) AVERAGE	YEARS OF RECORD
15B11	Baree Creek	5500	5/2	90	43.2	52.0	-	-
15B1	Baree Mountain	6000	5/2	92	42.8	53.6	46.8	15
13B10	Coyote Hill	4200	4/29	3	0.9	2.1	2.2	11
15C2	Fish Lake Airstrip	5000	4/29	87	40.4	40.6	45.5	3
15B10	Freezeout Summit	6800	4/29	78	29.2	37.7	36.3	11
15C1	Hoodoo Creek	6200	4/28	103	39.4	52.1	49.7	10
14C5	Lolo Pass	5230	4/26	68	28.4	32.2	29.9	14
15B2	Lookout	5250	4/29	76	33.7	34.6	31.8	15
13C8	Lubrecht Forest #6	4040	5/2	0	0	0	0.2	6
13B7	North Fork Jocko	6330	5/4	83	40.7	62.4	46.0	8
14C6	Powell Ranger Station	4230	4/26	0	0	0	-	-
13C1	Stuart Mountain	7400	4/30	64	16.5	-	30.0	10
14B1	TV Mountain	6800	4/30	36	13.4	24.6	-	-

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

WATER SUPPLY OUTLOOK

UPPER CLARK FORK RIVER BASIN

MONTANA

AS OF:

MAY 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The 1960 Water Supply Outlook for the Upper Clark Fork River improved during April. Precipitation during April increased the snow-pack in the Upper Clark Fork basin to 110 percent of the 1943-57 May 1 average.

Snow surveys made near the first of May indicate that water stored in the snow-pack is almost equal to that of a year ago.

May through September streamflow forecasts for Flint Creek, Boulder Creek and the Middle Fork of Rock Creek vary from 70 to 80 percent of the 1943-57 average. The Clark Fork River above Milltown is forecast to flow 469,000 acre feet during the May through September period. This flow is 67 percent average and 79 percent of last year. The Blackfoot River is forecast to flow 87 percent of the 1943-57 average during May through September, or about 33 percent less than last year.

Small ungaged streams in the Upper Clark Fork basin should produce 10 to 25 percent below normal flow during the next five months.

Report Prepared by

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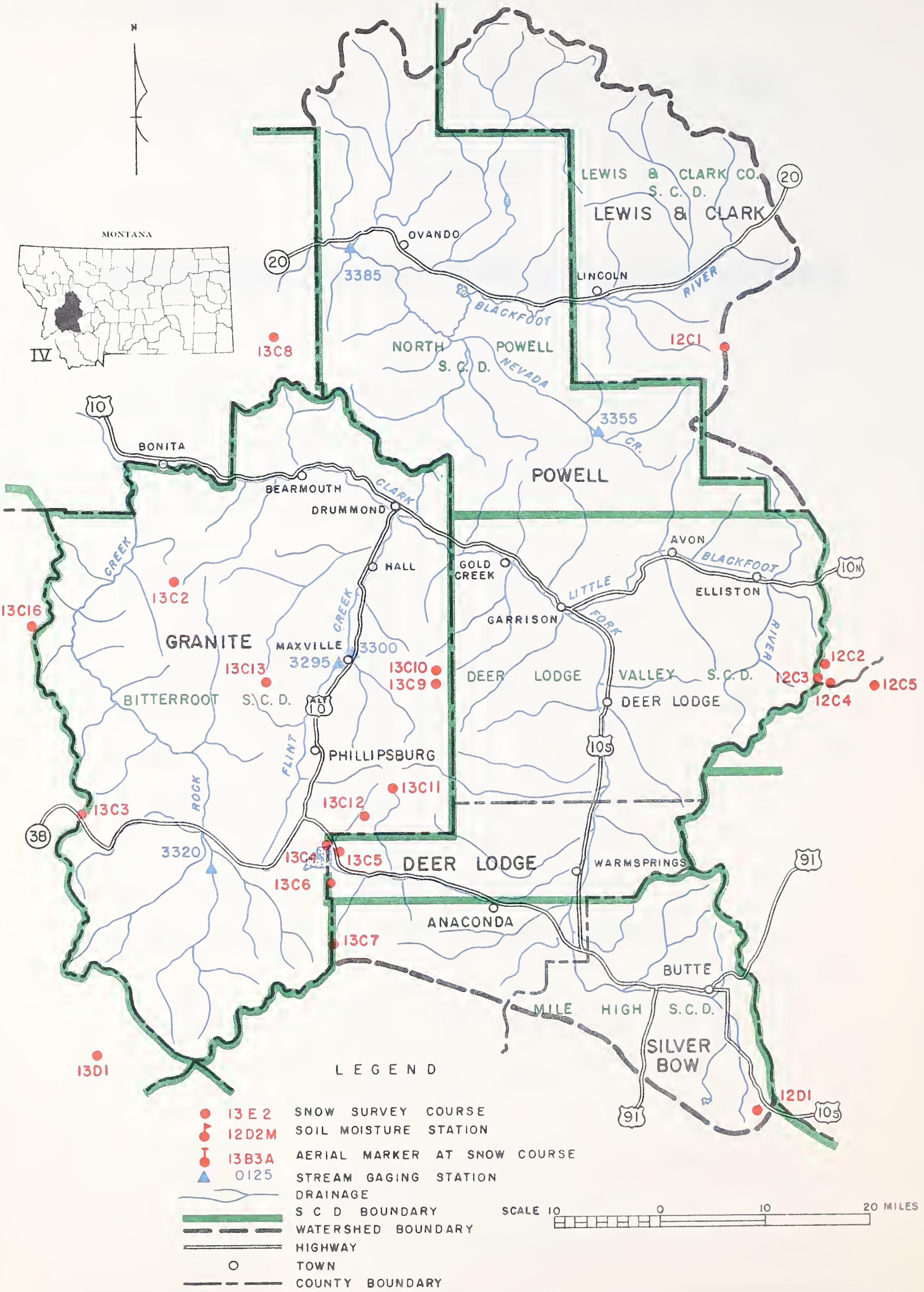
THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

USDA SCS LINCOLN NEBR 1960



USDA SCS LINCOLN NEBR 1960

5,L-16,396

WATER SUPPLY FORECASTS

AS OF MAY 1, 1960 - WATERSHED IV

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	% NORMAL	MEASURED +	
NO.	NAME				LAST YEAR	NORMAL
	FLINT CREEK					
3295	Maxville (at)	May-Sept	27.0	70	47.2#	38.7
		May-July	19.0	69	33.5#	27.6
		May-June	13.5	67	23.0#	20.2
	BOULDER CREEK					
3300	Maxville (at)	May-Sept	21.4	81	25.4#	26.4
		May-July	19.4	81	23.2#	24.0
		May-June	16.1	82	19.4#	19.6
	MIDDLE FORK ROCK CREEK					
3320	Philipsburg (near)	May-Sept	60.1	80	69.5#	75.6
		May-July	54.0	80	62.4#	67.6
		May-June	43.9	80	52.9#	54.8
	CLARK FORK RIVER					
3404	Milltown (above) (14)	May-Sept	469	67	591	698
		May-July	395	66	504	600
		May-June	324	66	409	492

(14) Difference in observed flow, Clark Fork above Missoula & Blackfoot at Bonner.
(+) Provisional data furnished by U. S. Geological Survey.
(#) 1958 data; 1959 data not available.

RESERVOIR STORAGE DATA

AS OF APRIL 30, 1960

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
3250	Georgetown Lake	31.0	24.3	21.4	21.2

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

SNOW SURVEY DATA

AS OF MAY 1, 1960

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		
						WATER CONTENT (Inches)		
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	LAST YEAR	AVERAGE	YEARS OF RECORD
13C16	Ambrose	6475	4/25	36	10.0	-	-	-
12C5	Chessman Reservoir	6200	4/29	13	2.5	2.5	2.6	15
12D1	Pipestone Pass	7200	5/2	23	6.5	3.2	3.3	13
12C1	Stemple Pass	6900	4/28	28	7.6	13.4	8.7	15
13C7	Storm Lake	7780	4/26	50	13.2	15.3	15.6	12
12C2	Ten Mile, Lower	6250	4/27	22	4.6	2.3	3.6	15
12C3	Ten Mile, Middle	6800	4/27	40	10.5	9.2	9.0	15
12C4	Ten Mile, Upper	8000	4/27	51	15.9	14.6	12.7	15

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

USDA SCS-LINCOLN NEBR 1960

5,L-16,395.2

WATER SUPPLY OUTLOOK

BITTERROOT RIVER BASIN

MONTANA

AS OF:

MAY 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The 1960 Water Supply Outlook for the Bitterroot valley has improved during April. Snow surveys made near the first of May indicate that water stored in the snow-pack is 89 percent of last year and 10 percent less than the 1943-57 average. Precipitation during April increased the snow-pack and improved soil moisture conditions throughout the drainage, with the northern portion receiving more than the headwaters of the Bitterroot drainage.

Streamflow forecasts for the May through September period are slightly higher than those issued last month, but are still much below average. The Bitterroot River near Darby is forecast to flow 377,000 acre feet during the May through September period, or 73 percent of the 1943-57 average.

Reservoir storage data for Como Lake and West Fork Bitterroot Reservoir is not available.

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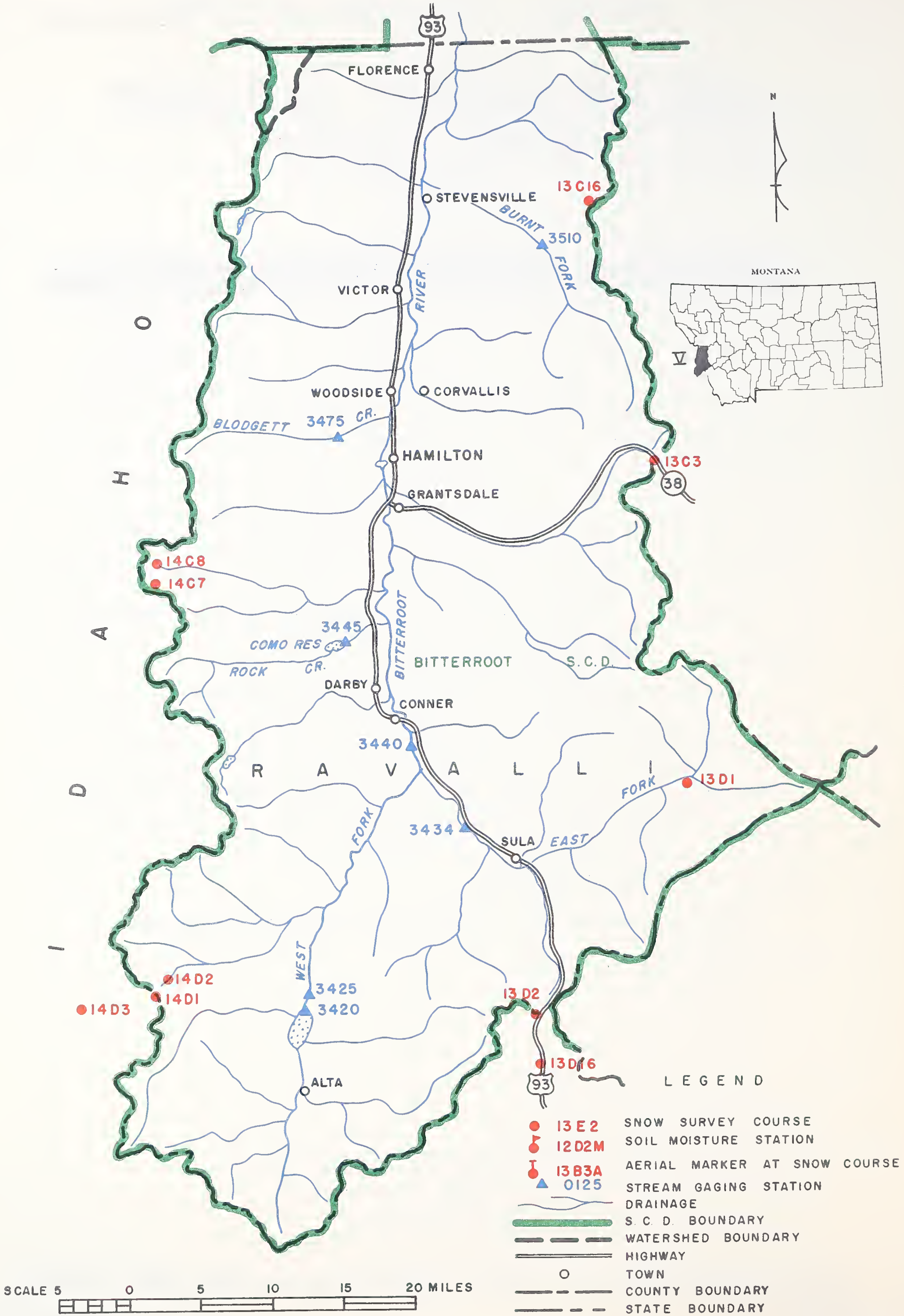
THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

USDA SCS LINCOLN NEBR 1960



USDA-SCS-LINCOLN NEBR 1960

5,L-16,518.2

WATER SUPPLY FORECASTS

AS OF MAY 1, 1960 - WATERSHED V

(1000 Acre Feet)

FORECAST POINT		FORECAST	FORECAST	%	MEASURED +	
NO.	NAME	PERIOD	THIS YEAR	NORMAL	LAST YEAR	NORMAL
3425	WEST FORK BITTERROOT RIVER Conner (near) (15)	May-Sept	107	70	166	153
		May-July	99	70	154	141
		May-June	87	70	139	124
3440	BITTERROOT RIVER Darby (near)	May-Sept	377	73	525	519
		May-July	341	71	477	479
		May-June	288	70	412	409
3475	BLODGETT CREEK Corvallis (near)	May-Sept	40.8	98	41.6	41.9
		May-July	38.9	98	38.8	39.6
		May-June	32.5	98	32.3	33.1
3510	BURNT FORK CREEK Stevensville (near)	May-Sept	19.0	66	23.8	28.6
		May-July	16.2	65	20.4	25.3
		May-June	12.9	64	17.0	20.4

(15) Observed flow plus change in storage in West Fork Bitterroot River Reservoi
(+) Provisional data furnished by U. S. Geological Survey.

RESERVOIR STORAGE DATA

AS OF

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

USDA-SCS-LINCOLN NEBR. 1960

SNOW SURVEY DATA

AS OF MAY 1, 1960

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		
						WATER CONTENT (Inches)		
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	LAST YEAR	AVERAGE	YEARS OF RECORD
13C16	Ambrose	6475	4/25	36	10.0	-	-	-
13D2	Gibbons Pass	7100	4/28	51	17.5	22.4	23.5	15
14C5	Lolo Pass	5230	4/26	68	28.4	32.2	29.9	14
14C7	Lost Horse	5940	4/26	73	28.1	-	-	-
14D2	Nez Perce Camp	5580	4/27	29	10.0	9.8	8.6	13
14D1	Nez Perce Pass	6575	4/27	35	11.4	11.6	12.6	15
14C6	Powell R. S.	4230	4/26	0	0	0	-	-
14C8	Twin Lakes	6510	4/26	102	38.4	-	-	-

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

USDA SCS-LINCOLN NEBR 1960

WATER SUPPLY OUTLOOK

MARIAS, TETON, & SUN RIVER BASINS

MONTANA

AS OF:

MAY 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The 1960 Water Supply Outlook for the Marias, Teton and Sun River basins has improved during the past month.

Snow surveys made near the first of May indicate that water stored in the snow-pack is 67 percent of last year and 80 percent of the 1943-57 average.

The Marias River is forecast to flow 458,000 acre feet during the May through September period. The Sun River at Gibson Dam is forecast to flow 402,000 acre feet during the May through September period. This is about 40 percent less than last year.

Precipitation during April improved soil moisture throughout the drainage.

Reservoir storage is above average for this time of year.

Report Prepared by

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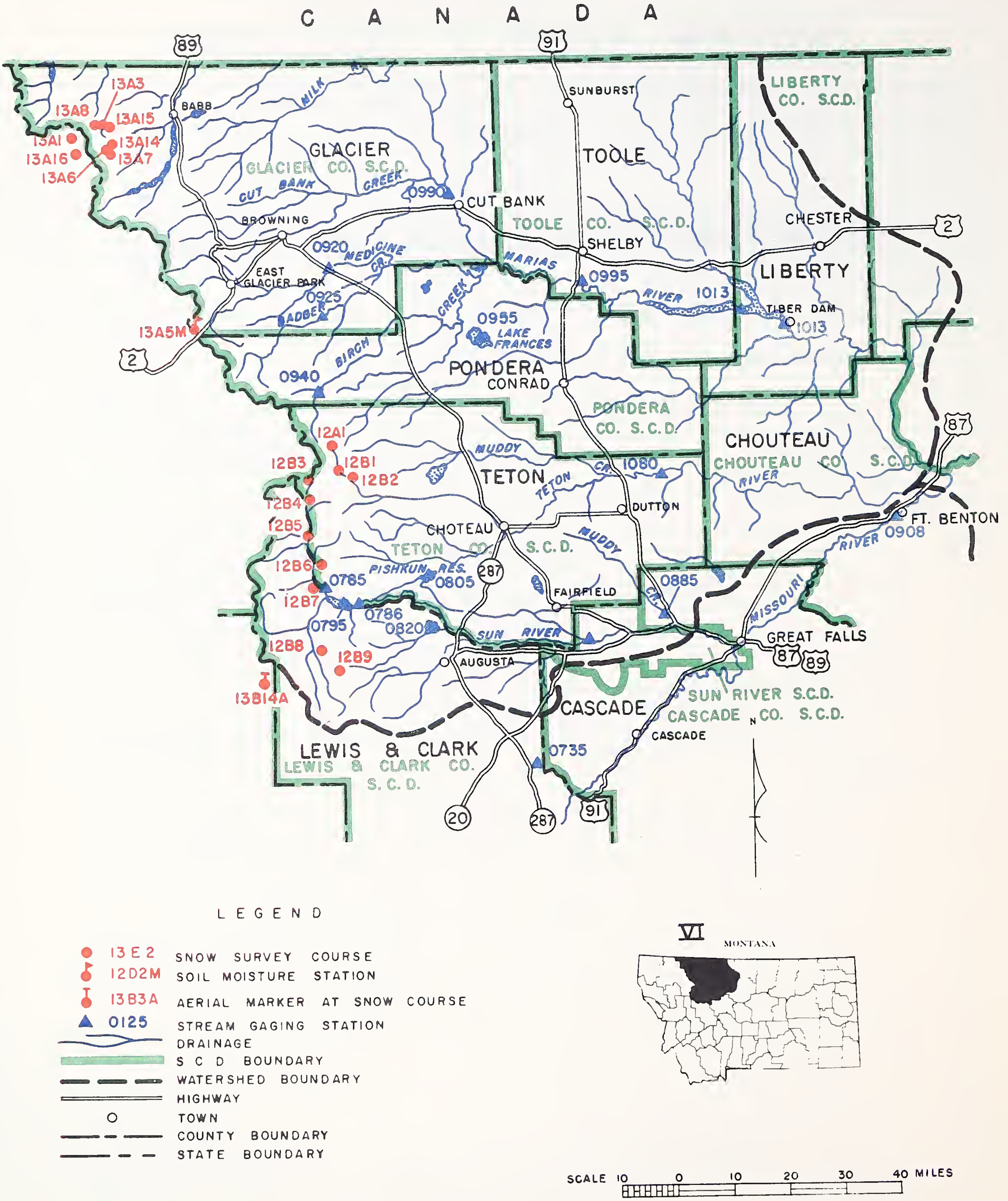
THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

USDA SCS LINCOLN NEBR 1960


C A N A D A
89
91
2
87
89
287
20
91
13A3
13A8
13A15
13A1
13A14
13A16
13A7
13A6
13A5M
BABB
MILK R.
GLACIER
GLACIER CO. S.C.D.
CUT BANK CREEK
0990
CUT BANK
BROWNING
EAST GLACIER PARK
0920
MEDICINE CR.
0925
BADGER
SUNBURST
TOOLE
TOOLE CO. S.C.D.
SHELBY
MARIAS
0995
RIVER
1013
LIBERTY CO. S.C.D.
CHESTER
LIBERTY
TIBER DAM
1013
CREEK
0955
LAKE FRANCES
PONDERA
CONRAD
0940
BIRCH
PONDERA CO. S.C.D.
CHOUTEAU
CHOUTEAU CO. S.C.D.
RIVER
12A1
12B3
12B1
12B2
12B4
12B5
12B6
12B7
12B8
12B9
13B14A
MUDDY
TETON
TETON
CR.
1080
DUTTON
CHOTEAU
TETON CO. S.C.D.
MUDDY
PISHKUN RES.
0785
0805
0786
0795
0820
FAIRFIELD
0885
CR.
SUN RIVER
AUGUSTA
FT. BENTON
RIVER 0908
MISSOURI
GREAT FALLS
SUN RIVER S.C.D.
CASCADE
CASCADE CO. S.C.D.
CASCADE
0735
N
LEWIS & CLARK
LEWIS & CLARK CO. S.C.D.
LEGEND
13E2 SNOW SURVEY COURSE
12D2M SOIL MOISTURE STATION
13B3A AERIAL MARKER AT SNOW COURSE
0125 STREAM GAGING STATION
DRAINAGE
S C D BOUNDARY
WATERSHED BOUNDARY
HIGHWAY
TOWN
COUNTY BOUNDARY
STATE BOUNDARY
VI
MONTANA
SCALE 10 0 10 20 30 40 MILES

WATER SUPPLY FORECASTS

AS OF MAY 1, 1960 - WATERSHED VI

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	% NORMAL	MEASURED +	
NO.	NAME				LAST YEAR	NORMAL
0785	N. FORK OF N. FORK SUN Augusta (near)	May-Sept May-July	182 170	76 76	273 250	225 207
0786	SUN RIVER Gibson Dam (at)	May-Sept May-July	402 368	73 73	695 635	551 501
0995	MARIAS RIVER Shelby (near)	May-Sept May-July	458 416	79 79	600 548	581 527

(+) Provisional data furnished by U. S. Geological Survey.

RESERVOIR STORAGE DATA

AS OF APRIL 30, 1960

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
1013	Tiber	1316.0	658.5	714.0	-
0955	Lake Francis	112.0	101.7	97.2	99.9
0805	Pishkun	32.0	29.4	19.2	20.7
0795	Gibson	105.0	82.7	73.2	70.6
0820	Willow Creek	32.3	26.8	28.7	21.1
0940	Swift	30.0	30.1	30.2	27.3

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

SNOW SURVEY DATA

AS OF MAY 1, 1960

SNOW COURSE			CURRENT INFORMATION			PAST RECORD WATER CONTENT (Inches)		YEARS OF RECORD
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	LAST YEAR	AVERAGE	
12B7	Goat Mountain	7000	5/1	19	5.6	-	12.4	3
13A3	Iceberg Lake #3	5600	5/4	55	24.6	33.5	27.1	15
13A14	Josephine Lower #9	4900	5/3	34	12.1	20.3	21.6	3
13A5M	Marias Pass	5250	4/30	40	13.3	21.4	15.7	15
13A7	Mount Allen #7	5700	5/3	95	38.0	54.6	47.3	15
13A6	Piegan Pass #6	5500	5/3	75	31.6	46.7	38.4	15
13A8	Ptarmigan #8	5800	5/4	74	31.1	46.6	37.8	15

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

WATER SUPPLY OUTLOOK

MISSOURI RIVER (MAIN STEM) BASIN
MONTANA

AS OF:
MAY 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The 1960 Water Supply Outlook for the Missouri Main Stem from Toston to Fort Peck is forecast at 81 to 83 percent of the 1943-57 average. Tributary streams with headwaters near the Continental Divide should produce near average to slightly above average flow during the May through September period. Tributary streams to the Smith River should flow slightly below average during the May through September period.

Precipitation during April improved the condition of soil moisture at lower elevations and increased the snow-pack at higher elevations. Snow courses along the Continental Divide show above average water content for this time of year, while Kings Hill snow course is 100 percent of the 1943-57 average.

Reservoir storage is above average with the exception of Fort Peck, which is 97 percent average.

Report Prepared by
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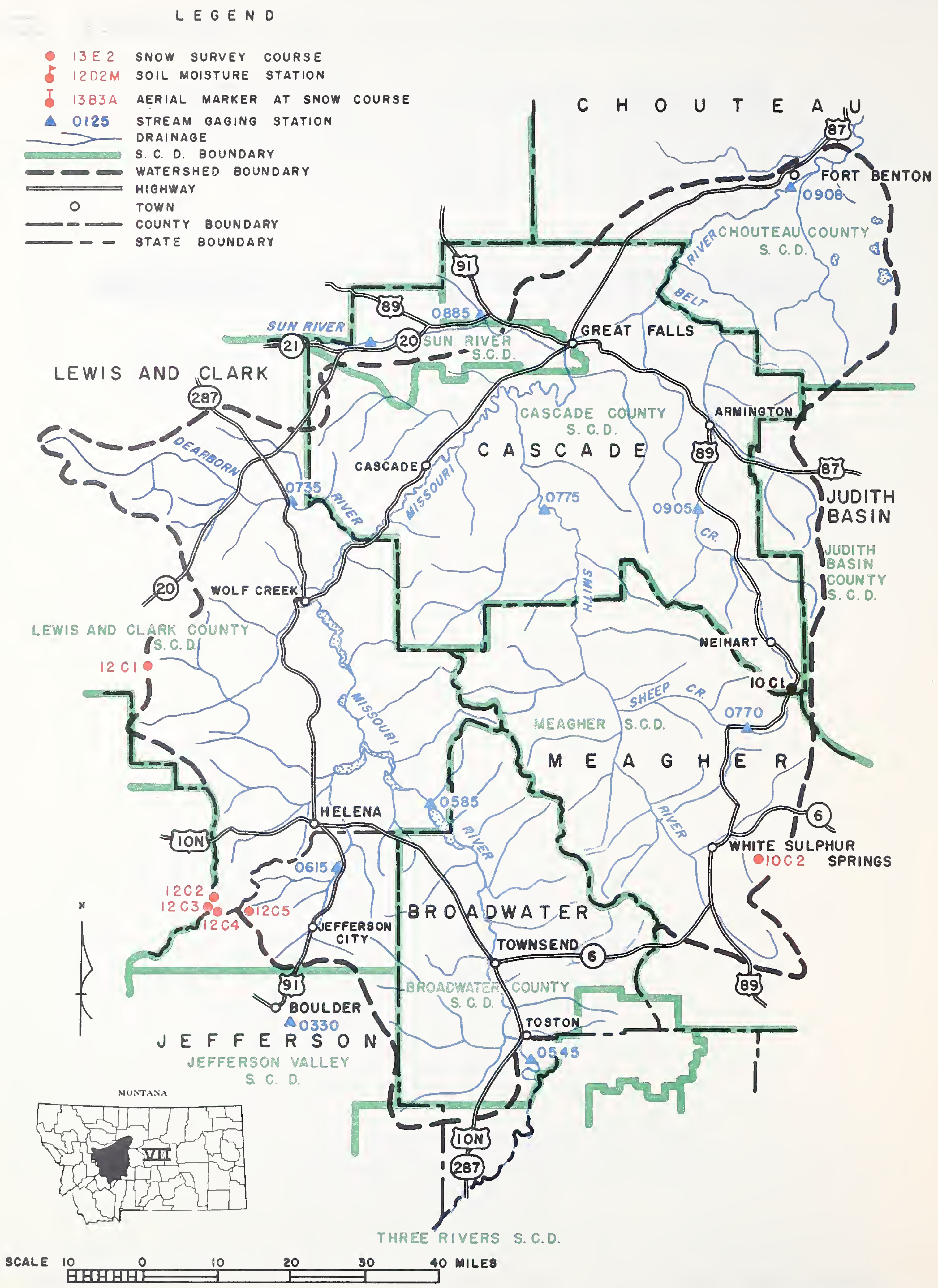
USDA SCS LINCOLN NEBR 1960


LEGEND
● 13E2 SNOW SURVEY COURSE
12D2M SOIL MOISTURE STATION
13B3A AERIAL MARKER AT SNOW COURSE
▲ 0125 STREAM GAGING STATION
DRAINAGE
S. C. D. BOUNDARY
WATERSHED BOUNDARY
HIGHWAY
○ TOWN
COUNTY BOUNDARY
STATE BOUNDARY
CHOUTEAU
87
FORT BENTON
0906
CHOUTEAU COUNTY S. C. D.
RIVER
BELT
91
89
0885
SUN RIVER
21
20
SUN RIVER S.C.D.
GREAT FALLS
LEWIS AND CLARK
287
DEARBORN
CASCADE COUNTY S. C. D.
ARMINGTON
CASCADE
CASCADE
MISSOURI
87
JUDITH BASIN
0735
RIVER
0775
0905
CR.
JUDITH BASIN COUNTY S. C. D.
SMITH
20
WOLF CREEK
LEWIS AND CLARK COUNTY S. C. D.
NEIHART
12C1
10C1
SHEEP CR.
MISSOURI
0770
MEAGHER S.C.D.
MEAGHER
0585
RIVER
HELENA
RIVER
6
10N
WHITE SULPHUR SPRINGS
10C2
0615
12C2
12C3
12C5
12C4
N
BROADWATER
JEFFERSON CITY
TOWNSEND
6
91
89
BROADWATER COUNTY S. C. D.
BOULDER
0330
TOSTON
0545
JEFFERSON
JEFFERSON VALLEY S. C. D.
MONTANA
VII
10N
287
THREE RIVERS S. C. D.
SCALE 10 0 10 20 30 40 MILES

WATER SUPPLY FORECASTS

AS OF MAY 1, 1960 - WATERSHED VII

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	% NORMAL	MEASURED +	
NO.	NAME				LAST YEAR	NORMAL
	MISSOURI RIVER					
0545	Toston (at) (3)	May-Sept	1643	82	1698	2006
		May-July	1393	82	1432	1693
0908	Fort Benton (at) (5)	May-Sept	2584	83	2697	3098
		May-July	2150	83	2212	2575
1095	Virgelle (at) (6)	May-Sept	3106	82	3417	3799
		May-July	2614	81	2848	3209
1150	Zortman (near) (6)	May-Sept	3391	82	3931	4140
		May-July	2826	81	3276	3477
1320	Ft. Peck Dam (below)(7)	May-Sept	3244	81	3443	4027
		May-July	2758	80	2946	3446
1770	Wolf Point (near) (7)	May-Sept	3400	80	3534	4256
		May-July	2887	79	3011	3647
3300	Williston, N. D. (8)	May-Sept	7505	71	9428	10565
		May-July	6562	72	8836	9144
	PRICKLY PEAR CREEK					
0615	Clancy (near)	May-Sept	23.4	113	15.5	20.7
		May-July	20.0	114	13.3	17.6

(3) Observed flow plus change in storage in Hebgen and Ennis Lakes.
(5) Observed flow plus change in storage in Canyon Ferry.
(6) Observed flow plus change in storage in Canyon Ferry and Tiber Reservoirs.
(7) Observed flow plus change in storage in Canyon Ferry, Tiber and Fort Peck Reservoirs.
(8) Observed flow plus change in storage in Fort Peck, Canyon Ferry, Tiber, Buffalo Bill and Boysen Reservoirs.
(+) Provisional data furnished by U. S. Geological Survey.

RESERVOIR STORAGE DATA

AS OF APRIL 30, 1960

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
0585	Canyon Ferry	2043.0	1942.0	1925.0	1353.0
0645	Lake Helena	10.4	9.2	6.5	5.1
0660	Holter Lake	81.9	79.8	49.1	57.1
0650	Hauser Lk. & Lk.Helena	61.9	57.9	50.4	46.5
1315	Fort Peck	19410.0	11640.0	9659.0	12003.0

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

USDA SCS LINCOLN, NEBR 1960

SNOW SURVEY DATA

AS OF MAY 1, 1960

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		
						WATER CONTENT (Inches)		
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	LAST YEAR	AVERAGE	YEARS OF RECORD
12C5	Chessman Reservoir	6200	4/29	13	2.5	2.5	2.6	15
10C1	Kings Hill	7950	4/30	42	13.7	17.6	13.7	11
12C1	Stemple Pass	6900	4/28	28	7.6	13.4	8.7	15
12C2	Ten Mile, Lower	6250	4/27	22	4.6	2.3	3.6	15
12C3	Ten Mile, Middle	6800	4/27	40	10.5	9.2	9.0	15
12C4	Ten Mile, Upper	8000	4/27	51	15.9	14.6	12.7	15

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

WATER SUPPLY OUTLOOK

BEAVERHEAD, & JEFFERSON RIVER BASINS

MONTANA

AS OF:

MAY 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The 1960 Water Supply Outlook for the Beaverhead and Jefferson River basins is still much below normal on the Beaverhead, Red Rock and Ruby Rivers, and slightly below normal on the Big Hole and Jefferson Rivers.

Snow surveys made near the first of May indicate above normal water content at snow courses along the Continental Divide in the northern portion of the drainage. Below normal water content was measured at Gibbons Pass (Lost Trail Pass) and Elkhorn Hot Springs snow courses.

The Red Rock and Beaverhead Rivers are forecast to flow about 40 percent below average during the May through September period. The Big Hole and Jefferson Rivers are forecast to flow about 10 percent below normal for the May through September period, with the Boulder River forecast to flow 96 percent of the 1943-57 average.

Below normal precipitation in the summer months could result in a short water supply on the Beaverhead River during the irrigation season.

Report Prepared by

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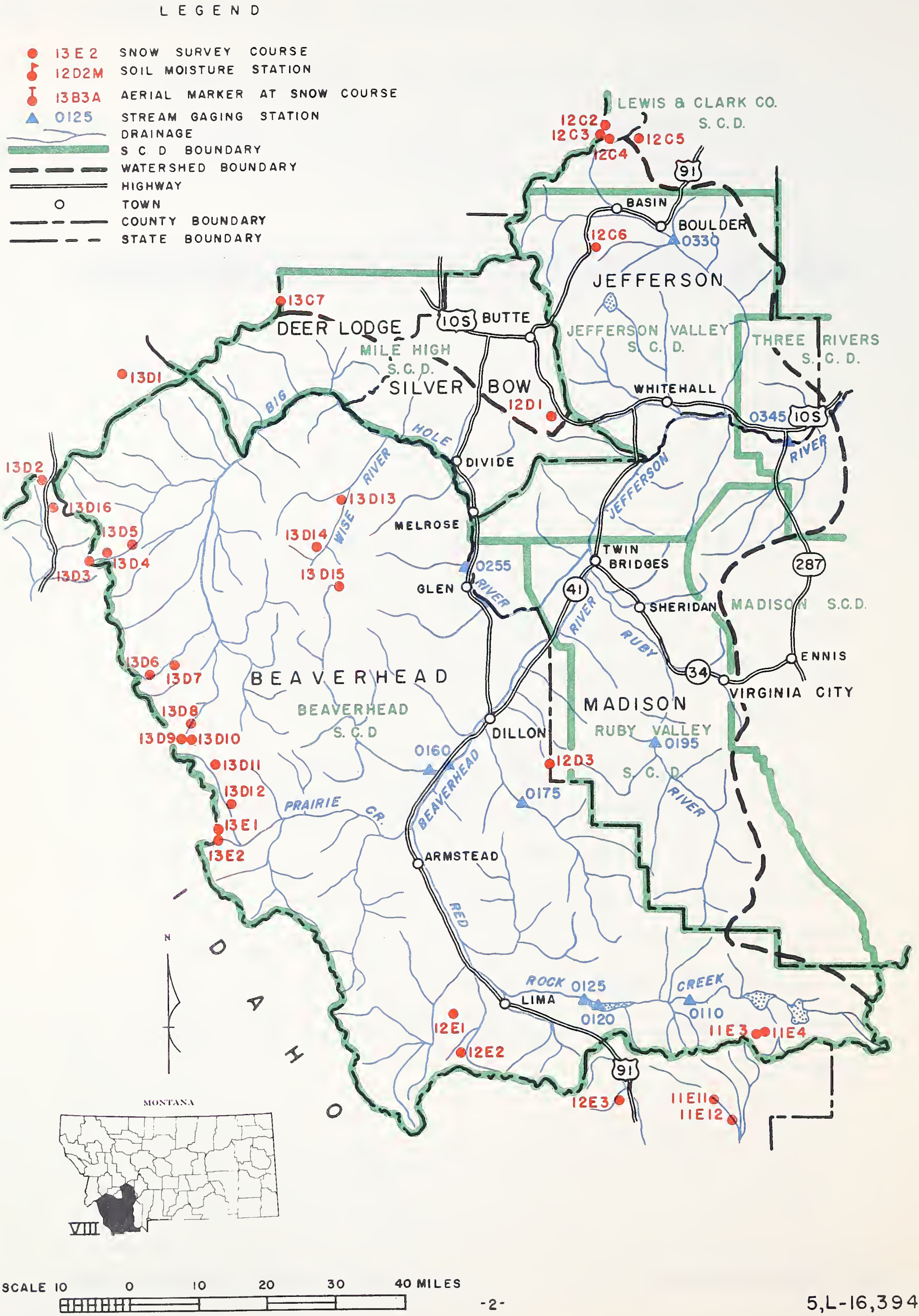
THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

USDA SCS LINCOLN NEBR 1960



USDA SCS LINCOLN NEBR 1960

5,L-16,394.2

WATER SUPPLY FORECASTS

AS OF MAY 1, 1960 - WATERSHED VIII

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	% NORMAL	MEASURED	+
NO.	NAME				LAST YEAR	NORMAL
	RED ROCK RIVER					
0110	Kennedy Ranch (at)	May-Sept	32.9	60	34.1	54.9
		May-July	29.5	60	28.8	49.1
0125	Monida (near) (1)	May-Sept	38.0	61	37.2	62.3
		May-July	35.4	61	32.7	58.1
	BEAVERHEAD RIVER					
0160	Barratts (at) (1)	May-Sept	77.5	60	58.2	129
		May-July	61.5	59	36.0	104
	BIG HOLE RIVER					
0255	Melrose (near)	May-Sept	606	91	553	668
		May-July	551	90	501	611
	BOULDER RIVER					
0330	Boulder (near)	May-Sept	66.6	96	59.2	69.4
		May-July	63.5	96	56.5	66.0
	JEFFERSON RIVER					
0345	Sappington (at)	May-Sept	820	90	695	913
		May-July	710	89	611	798

(1) Observed flow plus change in storage in Lima Reservoir.
(+) Provisional data furnished by U. S. Geological Survey.

RESERVOIR STORAGE DATA

AS OF

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

USDA-SCS-LINCOLN, NEBR. 1960

SNOW SURVEY DATA
AS OF MAY 1, 1960

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
			DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
NO.	NAME	ELEVATION				LAST YEAR	AVERAGE	
12C5	Chessman Reservoir	6200	4/29	13	2.5	2.5	2.6	15
13D15	Elk Horn	8450	4/28	18	5.8	8.8	8.7	9
13D2	Gibbons Pass	7100	4/28	51	17.5	22.4	23.5	15
11E4	Lakeview Canyon	6930	5/2	15	5.0	3.6	10.1	7
11E3	Lakeview Ridge	7400	5/2	9	3.1	2.5	7.6	7
12D1	Pipestone Pass	7200	5/2	23	6.5	3.2	3.3	13
13C7	Storm Lake	7780	4/26	50	13.2	15.3	15.6	12
12C2	Ten Mile, Lower	6250	4/27	22	4.6	2.3	3.6	15
12C3	Ten Mile, Middle	6800	4/27	40	10.5	9.2	9.0	15
12C4	Ten Mile, Upper	8000	4/27	51	15.9	14.6	12.7	15

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

USDA SCS LINCOLN NEBR 1960

WATER SUPPLY OUTLOOK

MADISON, & GALLATIN RIVER BASINS

MONTANA

AS OF:

MAY 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The 1960 Water Supply Outlook for the Madison and Gallatin drainages remains only FAIR. Snow surveys made near the first of May indicate that water stored in the snow is 77 percent of last year and 81 percent of the 1943-57 average. Snow courses in the headwaters of the Madison drainage are much below average, while those in the Gallatin drainage are generally above average.

The Madison River near West Yellowstone is forecast to flow 130,000 acre feet, or 70 percent average for the May through September period. The West Gallatin River is expected to flow about 25 percent less than average during May through September, while near average flow is forecast for Hyalite Creek.

Soil moisture is much above normal for this time of year.

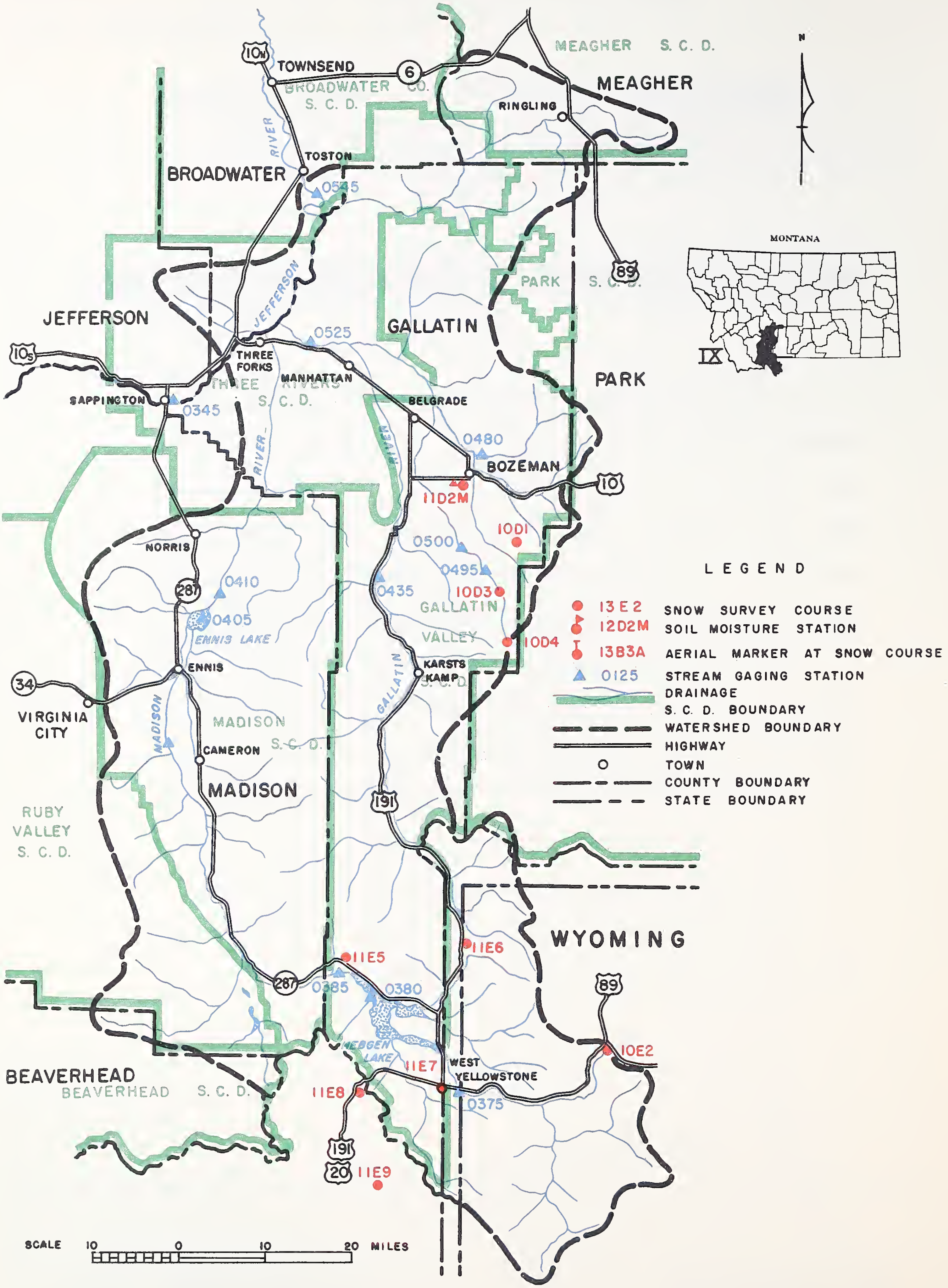
Reservoir storage is above average except for Hebgen Lake which has been lowered for repairs to Hebgen Dam.

Report Prepared by

A. R. CODD AND P. E. FARNES
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
BOX 855 BOZEMAN, MONTANA

THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

USDA SCS LINCOLN NEBR 1960


MEAGHER S. C. D.
MEAGHER
TOWNSEND
BROADWATER CO.
S. C. D.
RINGLING
TOSTON
BROADWATER
RIVER
0545
JEFFERSON
JEFFERSON
0525
GALLATIN
PARK S. C. D.
THREE FORKS
MANHATTAN
THREE RIVERS S. C. D.
SAPPINGTON
0345
BELGRADE
RIVER
RIVER
0480
BOZEMAN
PARK
11D2M
10D1
0500
NORRIS
0495
0410
0435
10D3
0405
GALLATIN VALLEY
ENNIS LAKE
10D4
ENNIS
KARSTS KAMP
S. C. D.
VIRGINIA CITY
GALLATIN
MADISON
MADISON S. C. D.
CAMERON
MADISON
RUBY VALLEY S. C. D.
WYOMING
11E6
11E5
0385
0380
HEBGEN LAKE
11E7
WEST YELLOWSTONE
10E2
BEAVERHEAD
BEAVERHEAD S. C. D.
11E8
0375
11E9
10W
10s
6
89
10
287
34
191
20
N
MONTANA
IX
LEGEND
13E2 SNOW SURVEY COURSE
12D2M SOIL MOISTURE STATION
13B3A AERIAL MARKER AT SNOW COURSE
0125 STREAM GAGING STATION
DRAINAGE
S. C. D. BOUNDARY
WATERSHED BOUNDARY
HIGHWAY
TOWN
COUNTY BOUNDARY
STATE BOUNDARY
SCALE 10 0 10 20 MILES

WATER SUPPLY FORECASTS

AS OF MAY 1, 1960 - WATERSHED IX

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	% NORMAL	MEASURED +	
NO.	NAME				LAST YEAR	NORMAL
	MADISON RIVER					
0375	West Yellowstone (near)	May-Sept	130	70	168	187
		May-July	96	70	112	136
0385	Grayling (near) (2)	May-Sept	274	70	321	389
		May-July	206	69	226	298
0410	McAllister (near) (3)	May-Sept	498	76	603	659
		May-July	384	74	450	516
	WEST GALLATIN RIVER					
0435	Gateway (near)	May-Sept	360	84	482	431
		May-July	307	84	394	367
0500	Hyalite Cr. R.S.(at)(4)	May-Sept	32.3	98	42.2	33.2
		May-July	27.5	98	36.6	28.2
	EAST GALLATIN RIVER					
0480	Bozeman (at)	May-Sept	34.0	92	39.2	37.2
		May-July	28.9	93	33.9	31.5
	GALLATIN RIVER					
0525	Logan (at)	May-Sept	340	80	455	427
		May-July	284	80	382	356

(2) Observed flow plus change in storage in Hebgen Lake.
(3) Observed flow plus change in storage in Hebgen and Ennis Lakes.
(4) Observed flow plus change in storage in Hyalite Reservoir.
(+) Provisional data furnished by U. S. Geological Survey.

RESERVOIR STORAGE DATA

AS OF APRIL 30, 1960

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
0380	Hebgen Lake	345.0	10.5	181.2	212.0
0405	Ennis Lake	41.0	37.6	37.3	34.4
0500	Middle Creek	8.0	5.2	4.8	4.6

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

SNOW SURVEY DATA

AS OF MAY 1, 1960

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		YEARS OF RECORD
			DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		
NO.	NAME	ELEVATION				LAST YEAR	AVERAGE	
10D4	Devil's Slide	8100	4/30	79	27.2	30.6	23.4	15
11E5	Hebgen	6550	4/30	0	0	4.2	3.9	15
10D3	Hood Meadow	6600	4/29	18	6.4	7.9	5.5	15
10E2	Norris Basin	7500	5/2	10	4.2	4.9	5.7	4
10D10	Sacajawea	6550	4/28	47	13.7	-	-	-
11E6	Twenty-One Mile	7150	4/30	24	9.8	12.3	14.5	15
11E7	West Yellowstone	6700	4/30	0	0	2.0	5.6	15

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

WATER SUPPLY OUTLOOK

JUDITH, & MUSSELSHELL RIVER BASINS

MONTANA

AS OF:

MAY 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the Judith and Musselshell River basins is GOOD. Kings Hill, the only snow course measured in the Judith-Musselshell drainage near the first of May, is 78 percent of last year and 100 percent of the 1943-57 average. Precipitation during April increased the snow-pack at higher elevations in the drainage and improved soil moisture conditions in the lower elevations.

Streamflow should be slightly above average for the May through September period on both the Judith and Musselshell drainages. The South Fork of the Musselshell above Martinsdale is forecast to flow 49,600 acre feet during the May through September period, or 107 percent of the 1943-57 average. This is slightly less than was measured for the same period last year.

Report Prepared by

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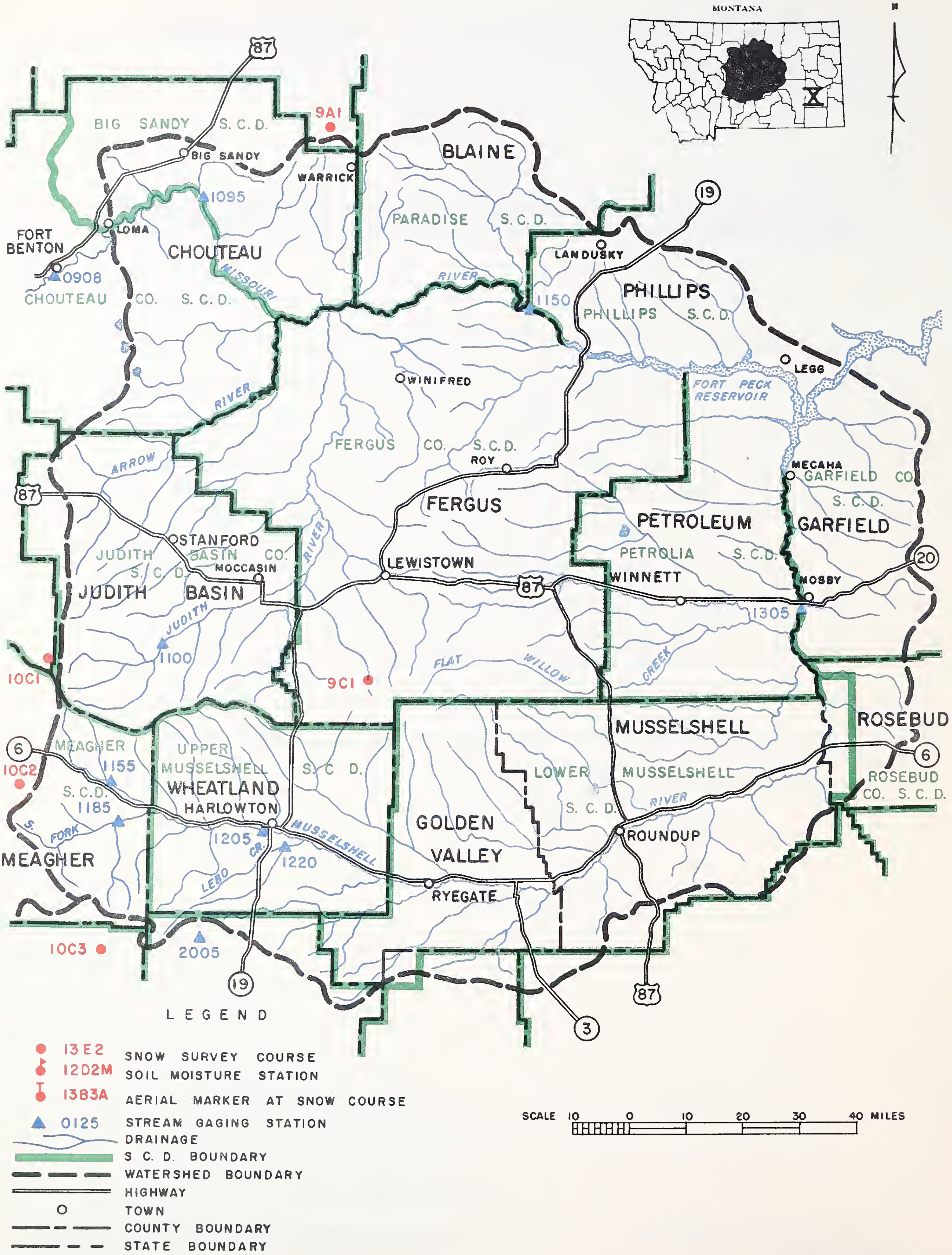
THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

USDA SCS LINCOLN NEBR 1960


MONTANA
N
BIG SANDY S. C. D.
BIG SANDY
9A1
WARRICK
BLAINE
1095
FORT BENTON
LOMA
CHOUTEAU
0908
CHOUTEAU CO. S. C. D.
MISSOURI
PARADISE S. C. D.
RIVER
LANDUSKY
19
1150
PHILLIPS
PHILLIPS S. C. D.
LEGG
FORT PECK RESERVOIR
WINIFRED
RIVER
ARROW
FERGUS CO. S.C.D.
ROY
MECAHA
GARFIELD CO. S. C. D.
GARFIELD
87
FERGUS
PETROLEUM
STANFORD
JUDITH BASIN CO. S. C. D.
MOCCASIN
RIVER
LEWISTOWN
PETROLIA S. C. D.
WINNETT
MOSBY
20
JUDITH
BASIN
JUDITH
1305
1100
10C1
9C1
FLAT
WILLOW
CREEK
MUSSELSHELL
ROSEBUD
6
MEAGHER S.C.D.
10C2
1155
UPPER MUSSELSHELL S. C. D.
WHEATLAND
HARLOWTON
1185
LOWER MUSSELSHELL S. C. D.
RIVER
ROSEBUD CO. S. C. D.
S. FORK
MEAGHER
1205
CR.
1220
MUSSELSHELL
GOLDEN VALLEY
ROUNDUP
LEBO
RYEGATE
10C3
2005
3
LEGEND
13E2 SNOW SURVEY COURSE
12D2M SOIL MOISTURE STATION
13B3A AERIAL MARKER AT SNOW COURSE
0125 STREAM GAGING STATION
DRAINAGE
S. C. D. BOUNDARY
WATERSHED BOUNDARY
HIGHWAY
TOWN
COUNTY BOUNDARY
STATE BOUNDARY
SCALE 10 0 10 20 30 40 MILES

WATER SUPPLY FORECASTS

AS OF MAY 1, 1960 - WATERSHED X

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	% NORMAL	MEASURED +	
NO.	NAME				LAST YEAR	NORMAL
	MUSSELSHELL RIVER					
	South Fork					
1185	Martinsdale (above)	May-Sept	49.6	107	52.8	46.3
		May-July	47.4	107	50.8	44.2
1205	Harlowton (at) (9)	May-Sept	72	105	59.7	68.2
		May-July	71	105	58.8	67.2
	MISSOURI RIVER					
1095	Virgelle (at) (6)	May-Sept	3106	82	3417	3799
		May-July	2614	81	2848	3209
1150	Zortman (near) (6)	May-Sept	3391	82	3931	4140
		May-July	2826	81	3276	3477

(6) Observed flow plus change in storage in Canyon Ferry and Tiber Reservoirs.
(9) Observed flow plus change in storage in Durand and Martinsdale Reservoirs.
(+) Provisional data furnished by U. S. Geological Survey.

RESERVOIR STORAGE DATA

AS OF APRIL 30, 1960

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
1190	Martinsdale	23.1		11.1	11.4
1165	Durand	7.0		7.0	6.2
1105	Ackley	5.8	4.6	2.6	4.3

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

SNOW SURVEY DATA

AS OF MAY 1, 1960

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		
						WATER CONTENT (Inches)		
NO.	NAME	ELEVATION	DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	LAST YEAR	AVERAGE	YEARS OF RECORD
10C1	Kings Hill	7950	4/30	42	13.7	17.6	13.7	11

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

WATER SUPPLY OUTLOOK

UPPER YELLOWSTONE RIVER BASIN

MONTANA

AS OF:

MAY 1, 1960

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

The Water Supply Outlook for the Upper Yellowstone River continues to be only FAIR.

Snow surveys made near the first of May indicate that water stored in the snow-pack is still much below average for this time of year.

The Yellowstone River at Corwin Springs is forecast to flow 1,273,000 acre feet during the May through September period. This is about 25 percent less than last year. The Stillwater River is expected to flow 80 percent average. The Clarks Fork River is expected to produce only 66 percent of last year during the May through September period. A bright spot exists in the Upper Yellowstone basin on the Shields River, where the flow is expected to be about 30 percent above average during May through September.

Soil moisture varies from near average to above average in the headwaters of the Yellowstone River and its tributaries.

Report Prepared by

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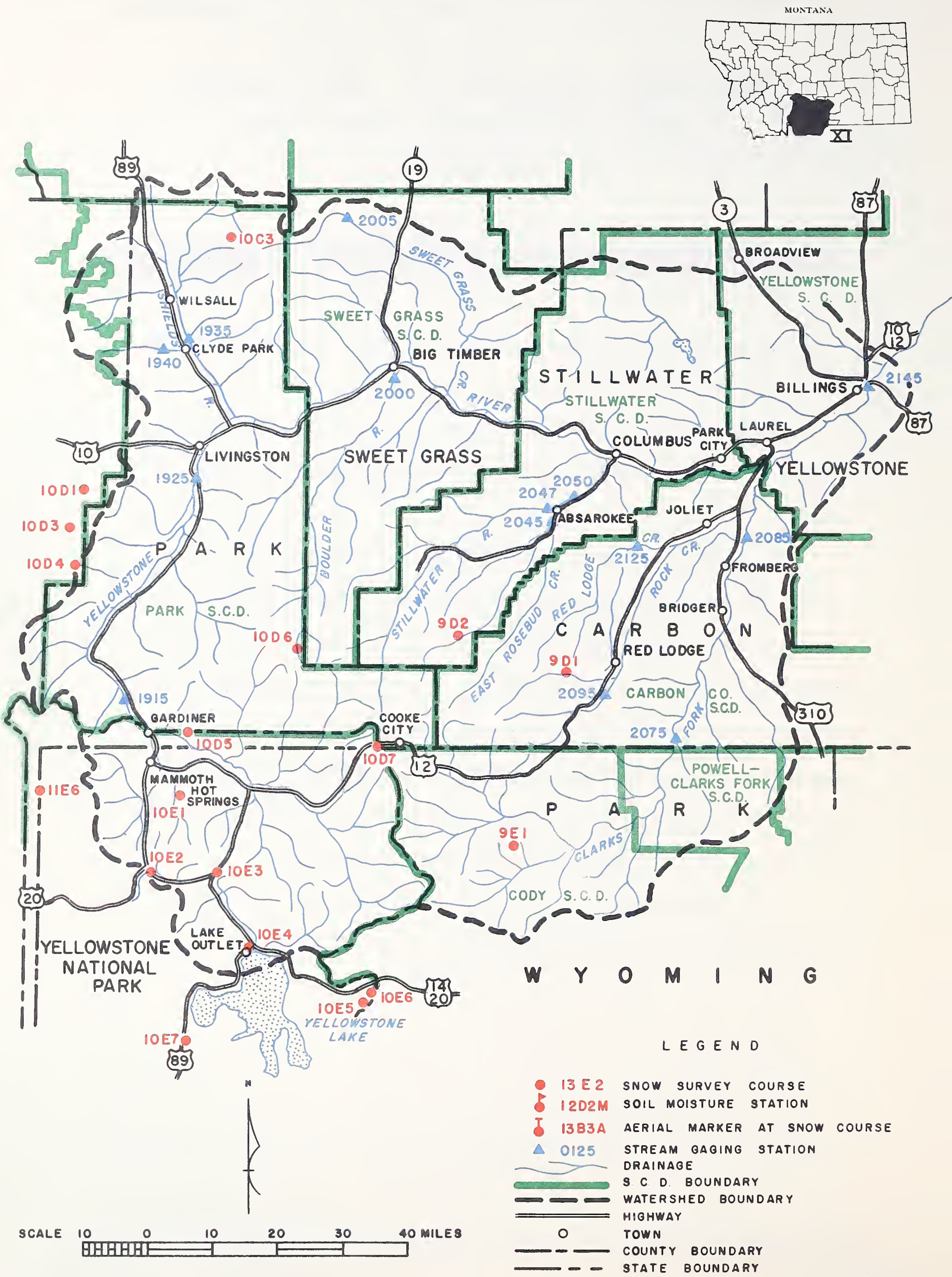
THE CONSERVATION OF WATER BEGINS WITH THE SNOW SURVEY

USDA-SCS LINCOLN NEBR 1960



LEGEND

● 13 E2	SNOW SURVEY COURSE
12D2M	SOIL MOISTURE STATION
13B3A	AERIAL MARKER AT SNOW COURSE
▲ 0125	STREAM GAGING STATION
	DRAINAGE
	S. C. D. BOUNDARY
	WATERSHED BOUNDARY
	HIGHWAY
○	TOWN
	COUNTY BOUNDARY
	STATE BOUNDARY

WATER SUPPLY FORECASTS

AS OF MAY 1, 1960 - WATERSHED XI

(1000 Acre Feet)

FORECAST POINT		FORECAST PERIOD	FORECAST THIS YEAR	% NORMAL	MEASURED +	
NO.	NAME				LAST YEAR	NORMAL
	YELLOWSTONE RIVER					
1915	Corwin Springs (at)	May-Sept	1273	67	1721	1888
		May-July	1056	68	1436	1557
1925	Livingston (near)	May-Sept	1393	65	2012	2136
		May-July	1127	64	1677	1747
2145	Billings (at)	May-Sept	2798	70	3878	3998
		May-July	2402	71	3392	3393
3090	Miles City (at) (13)	May-Sept	4170	67	4827	6182
		May-July	3647	68	4320	5339
3295	Sidney (near) (13)	May-Sept	4125	65	4394#	6362
		May-July	3599	66	4026#	5430
	SHIELDS RIVER					
1935	Clyde Park (at)	May-Sept	121	130	91.9	92.5
		May-July	108	127	86.3	84.8
	ROSEBUD CREEK					
2045	Absarokee (near) (12)	May-Sept	225	88	220	255
		May-July	178	87	185	204
	STILLWATER RIVER					
2050	Absarokee (near) (12)	May-Sept	473	80	549	594
		May-July	394	79	477	497
	CLARKS FORK RIVER					
2075	Chance (at)	May-Sept	413	70	626	590
		May-July	374	71	579	525
2085	Edgar (at)	May-Sept	437	71	622	616
		May-July	390	72	558	540
	ROCK CREEK					
2095	Red Lodge (near)	May-Sept	98	90	111	109
		May-July	76	91	83.9	83.6

(12) Observed flow plus change in storage in Mystic Lake.
(13) Observed flow plus change in storage in Buffalo Bill & Boysen Reservoirs.
(+) Provisional data furnished by U. S. Geological Survey.
(#) 1958 data; 1959 data not available.

RESERVOIR STORAGE DATA

AS OF APRIL 30, 1960

(1000 Acre Feet)

NO.	RESERVOIR	USABLE CAPACITY	MEASURED		
			THIS YEAR	LAST YEAR	NORMAL
2040	Mystic Lake	20.8	5.7	1.4	3.3

NOTE: ALL NORMALS BASED ON 1943-1957 (15 YEAR PERIOD)

USDA SCS-LINCOLN, NEBR 1960

SNOW SURVEY DATA

AS OF MAY 1, 1960

SNOW COURSE			CURRENT INFORMATION			PAST RECORD		
			DATE OF SURVEY	SNOW DEPTH (Inches)	WATER CONTENT (Inches)	WATER CONTENT (Inches)		YEARS OF RECORD
NO.	NAME	ELEVATION				LAST YEAR	AVERAGE	
10E3	Canyon	7500	5/1	25	8.7	11.8	13.1	9
10D7	Cooke City	7400	5/1	13	4.1	6.7	6.2	12
10D4	Devil's Slide	8100	4/30	79	27.2	30.6	23.4	15
10E6	East Entrance	7000	4/30	0	0	6.1	4.8	4
10D3	Hood Meadow	6600	4/29	18	6.4	7.9	5.5	15
10E4	Lake Camp	7850	5/1	15	5.0	6.5	8.9	10
9E1	Lodgepole	8200	4/28	22	5.5	10.9	11.1	14
10E1	Lupine Creek	7300	5/3	0	0	7.1	9.6	6
10E2	Norris Basin	7500	5/2	10	4.2	4.9	5.7	4
10D10	Sacajawea	6550	4/28	47	13.7	-	-	-
10E5	Sylvan Pass	7100	4/30	18	5.0	13.2	11.1	10

NOTE: ALL AVERAGES BASED ON 1943-1957 (15 YEAR PERIOD). "YEARS OF RECORD" INDICATED NUMBER OF YEARS USED IN 1943-1957 PERIOD.

STATUS OF RESERVOIR STORAGE

May 1, 1960

BASIN & STREAM	RESERVOIR	USABLE CAPACITY 1000 A.F.	USABLE STORAGE - 1000 ACRE FEET			
			1960	1959	1943-57 Average	Yrs.
MISSOURI RIVER BASIN - WYOMING						
Shoshone River	Buffalo Bill	372.5	130.3	44.7	230.3	15
Wind River	Boysen	560.0AC	146.5	84.1	405.0	5
Wind River	Pilot Butte	31.6	21.8	17.9	23.0	15
Bull Creek	Bull Lake	152.0	32.4	40.0	53.5	15
Belle Fourche	Key Hole	190.3AC	11.9	1.4	13.5	6
MISSOURI RIVER BASIN - NORTH DAKOTA						
Heart River	Lake Tschida	68.7AC	69.9	67.7	66.6	8
Heart River	E. A. Patterson	5.6AC	5.3	5.5	5.4	7
Missouri River	Garrison Lake	18100.0AC	5538.4	4051.4	-	-
James River	Jamestown	20.0AC	16.5	10.9	-	-
MISSOURI RIVER BASIN - SOUTH DAKOTA						
Belle Fourche	Belle Fourche	185.2AC	72.1	70.7	132.9	15
Cheyenne River	Angostura	90.0AC	30.0	52.0	53.0	6
Cheyenne River	Deerfield	15.1AC	3.0	9.6	13.7	10
Grand River	Shadehill	84.0AC	111.0	82.8	86.8	6
Missouri River	Ft. Randall	3800.0AC	3418.1	2950.9	-	-
Missouri River	Gavins Point	320.0AC	306.7	229.0	-	-
Missouri River	Oahe	17000.0AC	3192.0T	637.0T	-	-
Cheyenne River	Pactola	55.0AC	27.0	20.7	-	-

AC Active Capacity; USBR Billings.
T Total Storage.

WYOMING STREAMFLOW FORECASTS MAY 1960 2/

BASIN AND TRIBUTARY	April-September 30 Seasonal Streamflow in Thousands of Acre Feet				
	Forecast Runoff	Percent 15-Yr. Average	Measured Runoff 1958	Measured Runoff 1957	15-Year Average 1943-57
NORTH POPO AGIE Milford (near)	52	60	74	123	86*
LITTLE POPO AGIE Lander (near)	30	62	38	62	49*
WIND RIVER Dubois (at)	77	70	75	146	110*
SHOSHONE RIVER Buffalo Bill Dam (below) (1)	600	70	735	1115	851

---

* Average is for less than 15 years of record in the 1943-57 period.

(1) Observed flow corrected for storage in Buffalo Bill Reservoir and Heart Mountain Diversion.

2/ Forecasts prepared by George W. Peak, Soil Conservation Service, Casper, Wyoming.

WYOMING SNOW SURVEYS ABOUT MAY 1, 1960

			Current Information			Past Record		
						Water Content (In.)		
No.	Snow Course Name	Elev.	Date of Survey	Snow Depth (In.)	Water Content (In.)	Last Year	15-Year Average 1943-57	Years Record Used In Average
LOWER YELLOWSTONE - WIND RIVER								
9F12	Big Warm	8800	4/29	4	0.7	7.5	9.2**	5
9F4	Burroughs Creek	8800	5/1	23	6.6	14.3	15.7**	11
9F10	Dinwoodie	10000	5/2	37	9.6	12.7	15.2**	11
9F9	Dry Creek	9500	5/2	12	3.0	7.0	8.2**	11
9F6	Dunoir	8750	4/29	9	1.9	6.5	7.9**	18
9F7	Geyser Creek	8500	4/30	6	1.3	5.4	6.4**	11
9F8	Little Warm	9500	4/30	48	14.8	17.4	28.8**	11
9F14	Sheridan R.S. #2	7500	4/29	1	0.2	0.5	5.1**	5
9F3	T-Cross Ranch	8000	5/1	4	0.4	2.7	4.6*	17
#10F9	Togwotee Pass	9600	4/30	72	27.0	33.2	33.0e	11
LOWER YELLOWSTONE - OWL CREEK								
8F1	Owl Creek	8700	5/2	29	9.3	6.5	7.6**	11
LOWER YELLOWSTONE - GREYBULL RIVER								
9F3	Timber Creek #2	8800	4/30	12	2.9	3.5	4.5**	5
9F15	Wood River #2	8000	5/1	14	4.6	4.8	4.6*e	17
LOWER YELLOWSTONE - POPO AGIE RIVER								
8G2	Blue Ridge	9500	4/26	8	2.4	7.0	13.6	20
8G5	Bruce's Camp	6500	4/27	0	0	0	-	3
9G3	Hobbs Park	10000	5/4	39	12.9	16.5	21.9**	11
9G4	Mosquito Park R.S.	9500	5/4	6	2.2	6.6	8.2**	15
8G1	Sawmill Glade	8500	4/26	0	0	2.9	7.1	20
#8G3	South Pass	9000	4/25	15	4.3	7.4	16.3	20
9F11	St. Lawrence R.S.	9000	5/3	5	1.4	5.6	7.4*	16
9G2	Trout Creek	8400	5/4	0	0	2.9	3.2**	11
LOWER YELLOWSTONE - SHOSHONE RIVER								
9E4	Carter Mountain	7800	4/30	14	3.8	4.5	-	-
#10E6	East Entrance	7000	4/30	0	0	6.1	5.5**	6
#10E5	Sylvan Pass	7100	4/30	18	5.0	13.2	10.0*	18
#10F9	Togwotee Pass	9600	4/30	72	27.0	33.2	33.0e	11

* Average is for less than 15 years of record in the 1943-57 period.
** Average of all past data.
# Adjacent drainage
e Partial estimate during the 1943-57 base period.

WYOMING SNOW SURVEYS ABOUT MAY 1, 1960

No.	Snow Course Name	Elev.	Current Information			Past Record		
			Date of Survey	Snow Depth (In.)	Water Content (In.)	Water Content (In.) Last Year	Water Content (In.) 15-Year Average 1943-57	Years Record Used In Average
LOWER YELLOWSTONE - NOWOOD CREEK								
7F1	Bear Trap	8000	4/28	7	1.9			
7F2	Canyon Creek	7400	5/3	27	10.0			
7E25	Cold Springs Camp	8700	4/26	9	3.1	10.0	7.5**	4
7E24	Medicine Lodge Lake	9500	4/26	33	9.3	15.3		3
#7E8	Munkres Pass	9700	4/28	23	7.4	11.7	10.0**	9
#7E27	Onion Gulch	8100	4/28	20	5.6	12.5	9.6**	4
7E7	Tensleep R.S.	8300	4/27	0	0	10.0	9.4	23
7E35	Tyrell R.S.	8300	4/27	17	5.4	12.4	-	3
7E26	West Tensleep Lake	9075	4/27	28	8.6	14.2	-	3
LOWER YELLOWSTONE - SHELL CREEK								
7E21	Bald Mountain	9600	4/25	63	20.8	30.9	24.7**	4
#7E20	Beaver Tongue	9200	4/25	57	16.6	29.8	22.4**	4
#7E18	Bone Spring	9200	4/28	52	16.0	23.8	21.2**	4
7E22	Granite Creek Camp	7800	5/1	T	0	T	0.5**	4
#7E17	Granite Pass	8950	4/28	52	16.4	22.5	21.0**	4
7E4	Ranger Creek	8800	4/25	10	3.1	12.2	7.2	23
7E23	Shell Creek	9600	4/25	49	13.9	18.3	16.8**	4
LOWER YELLOWSTONE - PORCUPINE CREEK								
7E31	Five Springs Falls	7500	4/29	9	2.9	12.0	7.4**	4
7E30	Medicine Wheel	9000	4/25	44	14.6	25.9	18.1**	4
LOWER YELLOWSTONE - TONGUE RIVER								
#7E20	Beaver Tongue	9200	4/25	57	16.6	29.8	22.4**	4
7E32	Big Goose #2	7700	5/2	13	4.6	9.0	12.6**	4
#7E18	Bone Spring	9200	4/28	52	16.0	23.8	21.2**	4
7E33	Burgess R.S. #2	7900	4/26	24	7.8	12.6	9.0**	5
7E34	Dome Lake #2	8800	5/2	30	9.8	12.0	11.1**e	4
7E14	Gloom Creek	9300	4/27	48	15.3	19.8	17.6**	4
#7E17	Granite Pass	8950	4/28	52	16.4	22.5	21.0**	4
7E11	Sibley Lake	8000	4/29	23	6.9	14.4	12.1**	4
7E12	Sucker Creek	9000	4/27	35	11.9	19.0	15.8**	4
7E10	Steamboat Point	7500	4/29	21	6.5	13.6	11.8**	4
7E13	Wood Rock G.S.	8500	4/27	34	10.6	15.1	13.2**	4
LOWER YELLOWSTONE - POWDER RIVER								
6E2	Muddy Creek G.S.	7800	4/29	5	1.0	3.6	4.5**	4
#7E8	Munkres Pass	9700	4/28	23	7.4	11.7	10.0**	9
#7E27	Onion Gulch	8100	4/28	20	5.6	12.5	9.6**	4
7E5	Soldier Park	8700	4/27	15	4.3	7.5	6.1**	9
7E6	Sour Dough	8500	4/27	8	2.0	7.3	7.2	20

** Average of all past data - # Adjacent drainage - T Trace.
e Partial estimate during the 1943-57 base period.

Agencies Cooperating in Collecting Data Contained in this Bulletin

U. S. Forest Service
  Region I, Missoula, Montana

U. S. Geological Survey
  Helena, Montana

U. S. Army Corps of Engineers
  Portland, Oregon
  Seattle, Washington
  Omaha, Nebraska
  Riverdale, N. D.

U. S. Indian Irrigation Service
  St. Ignatius, Montana

U. S. Weather Bureau
  Helena, Montana

U. S. Fish & Wildlife Service
  Red Rock Lakes Refuge
  Monida, Montana

U. S. Bureau of Reclamation
  Billings, Montana
  Boise, Idaho

Montana Power Company
  Butte, Montana

Agricultural Experiment Station
  North Montana Branch Station
  Havre, Montana

Montana State Highway Dept.
  East Glacier, Montana

National Park Service
  Yellowstone National Park
  Glacier National Park

Montana Experiment Station
  Montana State College
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Bonneville Power Administration
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  Montana State University
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  Montana, Wyoming, Idaho

Soil Conservation Districts
  Montana Counties

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Water Rights Branch
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  Victoria, British Columbia

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